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Technical Report:
Tuberculosis Infection Control in Kyrgyzstan

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July 2009
Almaty, Kazakhstan

This publication is made possible by the support of the American people through the United States Agency for International Development (USAID). The contents are the sole responsibility of Abt Associates, Inc. and do not necessarily reflect the views of USAID or the United States Government.

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I. Acknowledgements

This assessment is an initiative of the U.S. Agency for International Development / ZdravPlus Project (USAID ZdravPlus Project). The financial support and initiative of USAID ZdravPlus Project made it possible to conduct this assessment of the prevention of tuberculosis in the health care facilities, with special consideration for health care facilities in Almaty and Talgar in Kazakhstan and Tokmok and Kara-Balta in Kyrgyzstan. We would like to express our appreciation to the staff of the health care facilities at sites visited for their collaboration and valuable time.

II. Acronyms Used in this Report

AFB	Acid-fast bacilli
AIDS	Acquired Immunodeficiency Syndrome
AII room	Airborne Infection Isolation room
BCG	Bacillus Calmette-Guérin, the Tuberculosis vaccine
BSC	Biosafety Cabinet
CAR	Central Asia Region
CCM	Country Coordination Mechanism for GFTAM grants
CPD	Continuous Professional Development
DOTS	Directly Observed Treatment Short-course
DR-TB	Drug Resistant TB
DST	Drug Sensitivity Testing
EQA	External Quality Assurance
FAP	Local health point
FGD	Focus Group Discussions
GDF	Global Drug Facility
GFATM or GF	Global Fund to fight AIDS, Tuberculosis and Malaria
GFATM PIU	Global Fund Project Implementation Unit
GLC	Green Light Committee
GOPA	Gesellschaft für Organisation, Planung und Ausbildung
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH
HC	Health Care
HCW	Health Care Worker
HCR	Health Care Reform
HEPA	High Efficiency Particulate Air (filter)
HIS	Health Information Systems

HIV	Human immunodeficiency virus
HSS	Health System Strengthening
IC	Infection Control
ICRC	International Committee of the Red Cross
IEC	Information, Education and Communication
KfW	Krediet Anstalt für Wiederaufbau, German Development Bank
MDR-TB	Multi Drug Resistant TB
MIA	Ministry of Internal Affairs
MMR	Mass miniature radiography
MOH	Ministry of Health
MOJ	Ministry of Justice
MSF	Médecins Sans Frontières
NCTP	National Center for Tuberculosis Problems
NRL	National Reference Laboratory for TB
NTP	National Tuberculosis Program
MDR-TB	Multi Drug Resistant TB
PS	Penitentiary System
SES	Sanitary and Epidemiological Service
SLD	Second Line Drug
SS+	Sputum smear positive TB cases
SS-	Sputum smear negative TB cases
TB	Tuberculosis
TBIC	Tuberculosis Infection Control
TOM	Treatment outcome
TOR	Terms of Reference
TRTBD	Talgar Regional TB Dispensary
USAID	United States Agency for International Development
UVGI	Ultraviolet Germicidal Irradiation
VCT	Voluntary counseling and testing

XDR-TB	Extensively Drug Resistant TB
WB	World Bank
WHO	World Health Organization

III. Executive Summary

ZdravPlus, upon the request of USAID, conducted a survey of tuberculosis infection control efforts in the Kyrgyz Republic. This included facility assessments, a review of relevant government regulations, and interviews with patients and health care providers. This review found serious deficiencies in infection control, which are contributing to the spread of TB, including MDR and XDR strains.

The current state of tuberculosis infection control leaves patients vulnerable to nosocomial transmission of MDR and XDR tuberculosis, and health care providers vulnerable to tuberculosis infection. While many structures are in place that could be used to slow the spread of tuberculosis, their technical basis is now out-of date. There are insufficient financial resources allocated to infection control to maintain modern technological measures.

Despite these challenges, there are a few simple, immediate measures that could improve TB infection control in Kyrgyzstan. They include frequently opening windows in health care facilities to encourage air flow, cleaning UVGI fixtures on a regular basis, preventing SS- and SS+ patients from mixing in health care facilities, and isolating MDR and XDR TB cases from the general patient population.

Strengths to Build on

- Citizens of Kyrgyzstan have good access to health care services.
- According to government policy, diagnosis of TB is free of charge to the patient.
- The network of TB doctors and facilities is established and there is good cooperation with PHC.
- The laboratory network of sputum smear laboratories is quality assured, and able to confirm TB diagnoses and potential infectiousness of patients.
- Diagnosis and treatment of MDR-TB is available.

Challenges to Improving Infection Control

- Health care providers sometimes fail to diagnose TB. As a result, the infectious patient may keep circulating between different health care facilities and spreading infection.
- Providers prefer X-rays over sputum smear for diagnosis.
- Access to MDR-TB diagnosis and treatment is not available to all.
- TB treatment can only be initiated by a TB specialist, who may be situated far from the home of the patient.
- PHC facilities are sometimes reluctant to refer patients to specialized TB services for diagnosis of MDR-TB.
- The delay for treatment of infectious TB cases is 2-4 weeks.
- Due to slow laboratory techniques, infectious patients stay in the same room with other patients for many months before being diagnosed with MDR/XDR-TB.
- Patients with TB, particularly re-treatment cases, are not motivated to access health care services and be treated because hospitalization is longer for re-treatment and TB drugs have unpleasant side effects
- Anecdotal reports indicate that some facilities accept money from patients despite the law ensuring free diagnosis and treatment of TB. Fear of out of pocket payments is a barrier to accessing TB care.

Immediate Recommendations

- Ensure that patients know their right to receive free of charge diagnosis and treatment, and consequently, have access to it.
- Ensure that the rooms are also well ventilated during winter
- Maximize natural ventilation by opening the windows of TB facilities on a regular schedule several times daily
- Use smoke tubes tests to track airflows in TB facilities, and open and close doors and windows to ensure air flows from clean areas toward dirty areas
- Teach respiratory hygiene and cough etiquette for patients

Medium-Term Recommendations

- Increase use of sputum spear microscopy to identify infectious TB patients quickly upon entering a facility
- Develop an TB IC plan for each facility
- Provide training for health care personnel in TB IC
- Ensure that patients with respiratory symptoms are isolated and prioritized in waiting rooms of primary care facilities
- Revise treatment guidelines to follow WHO recommendations and eliminate routine hospitalization for TB treatment
- Increase the number of UVGI fixtures in TB treatment facilities

Long-term Recommendations

- Ensure that infectious patients are promptly isolated and referred for treatment once they enter a health care facility
- Strengthen early case finding in order to decrease time of infectiousness and stop transmission of TB in society but also in the health care facilities
- Ensure that all patients with TB have access to appropriate diagnosis and treatment
- Look into the possibility of implementing quick diagnostic methods for MDR/XDR-TB in order to decrease the infections period of these patients
- Improve access to MDR and XDR TB diagnosis and treatment
- Revise the SES regulations in order to update them with regard to TB IC.
- Ensure that the health care personnel are using appropriate respirators (FFP3, FFP2, N95)
- Consider allowing PHC doctors and medical workers to start treatment of an infectious TB case without confirmation of TB specialist to decrease the time of infectiousness.
- Train health care providers to use sputum smear microscopy as the primary diagnostic tool for TB, not x-rays.

IV. Introduction

Upon request of USAID, country assessments focused on Tuberculosis Infection Control (TBIC) were undertaken in Kazakhstan and Kyrgyzstan during February and March 2009. This document covers the data collected in Kyrgyzstan.

The assessment came after the development of a conceptual infection control (IC) framework[1]. The conceptual framework was built on desk research, literature review, and key informant interviews. The global policies and strategies that support Tuberculosis Infection Control were used as references, e.g. Expanded framework for TB; Interim Policy for TB/HIV; MDR; Global Strategy for HIV/AIDS; Occupational Health and Safety; Infection Control, Patient Safety. Available expertise was used to create a map of conceptual reasons for why or how problems with infection prevention and control could contribute to increases in MDR-TB.

The assessment was implemented in response to a growing MDR/XDR-TB problem and high TB incidence among health care workers in the Central Asian Region (CAR). The goal of the assessment was to collect and generate reliable data on the IC situation in Kyrgyzstan in order to inform decision makers on existing problem areas and possible interventions for future programming. The ultimate aim is to strengthen TBIC and to minimize the transmission of TB in health care settings.

The IC assessment started from the facility level to identify strengths and weaknesses of TBIC at the hospital and primary health care levels, including institutional capacity and everyday practice, training of health care personnel, and the patient perspective with regard to access to prompt diagnosis and treatment.

A. Objectives

1. Using the conceptual map and a health systems approach specific to identifying and analyzing barriers to TB infection control, perform a situational assessment. The assessment should include collection and analysis of existing relevant government policies and documents, such as current national IC plans (if any), programs, laws, regulations, agency instructions, mapping existing infrastructures and relations between them, organograms, descriptions of actual practices, policies, and procedures related to IC, at different levels: national, province/district, and facility level.

   The facility level assessment should cover infection control procedures and capacities within health care and congregate settings including inpatient (hospital wards, labs, and emergency departments), outpatient, and non-traditional facility-based settings (e.g. detection and correctional facilities and long-term care settings). The assessment should look into IC systems across different programs (TB, HIV, Occupation health, IC, SES, etc.). Finally, the assessment will produce maps of key stakeholders (organizations and people) to play a role in IC. The situational assessment should also propose baseline data on IC. The assessment should answer the following questions:

   a. What is the state of infection control in TB facilities and in facilities where TB patients congregate?
   b. What are the obstacles for the proper functioning of the infection control system at the facility level?
   c. What systemic barriers to facility-level infection control exist, and what are their recommendations to address them?

2. Using the situational assessment data, identify existing problem areas for infection control and prevention and develop recommendations for interventions to address them. Different

[1] Borowitz M, O'Dougherty S, Muratov S, Turgunbaev M, Jafarov A, Maddix J, Pickett J. USAID ZdravPlus Project: A Health Systems Approach to TB Infection Control in Central Asia, December 2008 Almaty, Kazakhstan

interventions should be weighed based on cost/benefit/impact analyses to inform decision making. Recommendations should identify an array of existing gaps as well as develop the menu of possible interventions.

B. Materials and Methods

The methodology of assessment included:

- Analysis of components of TB control program and General Health Care (GHC) with an emphasis on infection control in health care facilities and also population at large;
- Review of project reports provided by international organizations and external assessment reports;
- Review of international and national guidelines on infection control;
- A focus on the civilian sector
- Interviewing target groups, such as patients and health care providers (use of standardized data collection tools and checklists to obtain qualitative data and data not available at country level);
- Assessment of the TB infection control program in the health care facilities using standardized data collection tools and checklists;
- Site visits to selected health care facilities, including TB facilities diagnosing and treating TB and MDR/XDR-TB, General Health Care facilities participating in TB case finding, diagnoses and follow-up of treatment, and the TB laboratory to assess the implementation of components of infection control, and to observe organization and delivery of TB services. The facilities were selected randomly, but accessibility and representativeness of the sites were considered; the balance between urban and rural districts was also considered.

C. Background on Tuberculosis

High rates of tuberculosis (TB) including drug-resistant tuberculosis (DR-TB) and increase of HIV infected people in Central Asia Region (CAR) have led to concern about the risk of tuberculosis spread within a health care setting.

Nosocomial transmission is of great concern because it affects not only other patients but also the personal health of HCWs and may result in HCWs leaving the workforce. Nonexistent or ineffective TB infection control (IC) measures facilitate *M. tuberculosis* transmission in these health care settings[2].

A review of the most common factors contributing to *M. tuberculosis* transmission in health care facilities at the district and referral levels shows that situation can be improved through simple control measures. Many of the TB control measures that are likely to have the greatest impact on reducing *M. tuberculosis* transmission (e.g., rapid diagnosis, isolation of infectious TB patients) can be implemented with minimal additional financial resources[3].

The risk of patients and HCWs acquiring TB could be significantly reduced if governments, health authorities, and HCWs themselves make infection control a high priority. HCWs are a valuable and often scarce resource, and their expertise cannot be easily replaced.

Effective TB infection control in health-care settings depends on:

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[2] Krüüner et al. Spread of Drug-Resistant Pulmonary Tuberculosis in Estonia. Journal of Clinical Microbiology, Sept.2001, p. 3339-3345

[3] Guidelines for the prevention of tuberculosis in health care facilities in resource-limited settings, 1999, World Health Organization, WHO/CDS/TB/99.269

- Early diagnosis of potentially infectious tuberculosis patients,
- Separating patients according to their potential infectiousness, including separation of drug-resistant TB patients from the other TB patients. TB and non-TB patients should be strictly separated.
- Prompt initiation of appropriate anti-tuberculosis treatment;

The primary emphasis of any TB infection control plan should be on achieving these goals.

In all health-care facilities, particularly those in which persons are at risk for TB work or receive care, policies and procedures for TB control should be developed, revived periodically, and evaluated for effectiveness to determine the actions needed to minimize the risk of transmission of *M. tuberculosis*.

TB infection control programs are based on a three-level hierarchy of controls: administrative, environmental, and respiratory protection [4,5,6].

Administrative controls are the most important of the three types of controls. At a minimum, administrative controls include conducting a TB risk assessment for the setting; developing a written TB infection control plan; implementing effective work practices for the management of patients with suspected or confirmed active TB disease; testing, evaluating, and educating healthcare workers and conducting problem evaluations as needed.

Environmental controls prevent the spread and reduce the concentration of droplet nuclei in ambient air. Environmental controls include controlling the sources of infection, diluting and removing contaminated air, and controlling airflow.

Respiratory protection controls further reduce risk of exposure to *M. tuberculosis* in situations that pose a high risk for exposure. Respiratory protection controls include implementation of a respiratory protection program, training HCWs in respiratory protection, and training patients in respiratory hygiene.

TB infection control programs for settings in which patients with suspected or confirmed TB disease are expected to be encountered should include the following steps[7].

1) Assign supervisory responsibility for the TB infection-control program to a designated person or group in the health-care facility. Give the supervisor or supervisory body the support, authority and financial means to conduct a TB risk assessment, implement and enforce TB infection-control policies, and ensure recommended training and education of HCWs.

2) Train the person responsible for implementing and enforcing the TB infection-control program.

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[4] Centers for Disease Control and Prevention. Guidelines for preventing the transmission of *Mycobacterium tuberculosis* in health-care settings, 2005. MMWR 2005; 54 (RR17).

[5] Tuberculosis Infection Control in the Era of Expanding HIV Care and Treatment. Addendum to WHO Guidelines for the Prevention of Tuberculosis in Health Care Facilities in Resource-Limited Settings, 2006, WHO_TB_99.269_ADD_eng

[6] Guidelines for the prevention of tuberculosis in health care facilities in resource-limited settings, 1999, World Health Organization, WHO/CDS/TB/99.269

[7] Centers for Disease Control and Prevention. Guidelines for preventing the transmission of *Mycobacterium tuberculosis* in health-care settings, 2005. MMWR 2005; 54 (RR17).

3) Conduct a risk assessment of the facility. Repeat the risk assessment periodically to evaluate the effectiveness of the TB infection-control program.

4) Develop a written TB infection control plan consisting of risk assessment, management of patients with suspected or confirmed TB disease, training and education of HCWs, screening and evaluation of HCWs, problem evaluation, and coordination.

5) Implement and maintain environmental controls, including rooms designed to maintain airborne infection isolation precautions (AII rooms).

6) Implement a respiratory protection program.

7) Outline a protocol for prompt recognition and initiation of airborne precautions for persons with suspected or confirmed TB, and update it annually.

8) Create a plan for accepting patients who have suspected or confirmed TB disease if they are transferred from another setting.

9) Conduct a problem evaluation if a case of suspected or confirmed TB is not promptly recognized and appropriate airborne precautions are not initiated, or if administrative, environmental, or respiratory-protection controls fail.

10) Perform a contact investigation if health-care–associated transmission of *M. tuberculosis* is suspected. Implement and monitor corrective action.

11) Implement and enforce policies and protocols to ensure early identification, diagnostic evaluation, and effective treatment of patients who may have infectious TB.

12) Coordinate activities with the local public health department, emphasizing reporting, and ensuring adequate discharge follow-up and the continuation and completion of therapy.

13) Support ongoing training and education of HCWs about TB, effective methods for preventing transmission of *M. tuberculosis*, and the benefits of medical screening programs.

Tuberculosis (TB) is a disease caused by *Mycobacterium tuberculosis* and occasionally by mycobacteria other than tubercle bacilli. The disease caused by *Mycobacterium tuberculosis* is infectious and is usually spread through the air. [8]

Tuberculosis can infect any organ of the body but it is mainly patients suffering from TB in their lungs that are infectious. When infectious people cough, sneeze, talk or spit, they excrete TB bacteria into the air.

A person needs to inhale only a small number of TB bacilli to be infected. People infected with TB will not necessarily become sick. *Mycobacterium tuberculosis* can lie dormant for years and cause disease later, when the immune system is weakened by diseases such as HIV infection or conditions such as extreme stress or malnutrition.

[8] World Health Organisation website, available on http://www.who.org

Tuberculosis can be successfully treated. However, if the wrong treatment is supplied, the drugs are taken irregularly, or the anti-TB drugs are of poor quality, resistance to the anti-TB drugs will often develop.

Multi-drug resistant tuberculosis (MDR-TB) is defined as infection caused by *Mycobacterium tuberculosis* strain resistant to at least isoniazid and rifampicin, the two most powerful anti-TB drugs. Rates of MDR-TB are high in some countries, particularly in the former Soviet Union. MDR-TB is difficult to treat. Its treatment has numerous side effects, is expensive and is at least 24 months long.

The emergence of extensively drug-resistant TB (XDR-TB) - defined as *Mycobacterium tuberculosis* strain resistant in vitro to the effects of isoniazid, rifampicin, a fluoroquinolone, and at least one of three injectable second-line drugs (amikacin, capreomycin or kanamycin) - poses a serious threat to TB control as this form of tuberculosis is in most instances beyond cure.

- One-third of the world's population, two billion people, are infected with the TB bacillus.
- When left untreated, a person suffering of TB can infect 10 to 15 people a year.
- 5-10% of people who are infected with TB bacilli become sick with TB at some time during their life.
- 50% of people who are infected with TB bacilli and HIV become sick with TB during their lifetime.

General Background on Kyrgyzstan

Table 1 Country data (selected)

	2008[9]
Population, total (millions)	5,356,869 (July 2008 est.)
Population growth rate	1.38% (2008 est.)
Life expectancy at birth, female (years)	73.33 years
Life expectancy at birth, male (years)	65.12 years
Unemployment rate	18% (2004 est.)
Administrative divisions	7 provinces and 1 city - Bishkek
GDP (current US$) (billions)	$11.66 billion (2008 est.)
GDP growth (annual %)	6
GNI, Atlas method (current US$) (billions)	US $590 (World Bank, 2007)
Inflation, consumer prices (annual %)	22.5

The Kyrgyz Republic (KR) is a low income[10] Central Asian country. It is landlocked and entirely mountainous, dominated by the Tien Shan range. It has borders with China, Kazakhstan, Tajikistan, and Uzbekistan. Kyrgyzstan became a Soviet Republic in 1936 and achieved independence in 1991 when the USSR dissolved. The economy is primarily agricultural. Cotton, tobacco, wool, and meat are the main agricultural products, although only tobacco and cotton are exported in any quantity. Industrial exports include gold, mercury, uranium, natural gas, and electricity.

Following independence, Kyrgyzstan was progressive in carrying out market reforms such as an improved regulatory systems and land reform. Kyrgyzstan was the first Commonwealth of Independent States (CIS) country to be accepted into the World Trade Organization. Much of the government's stock in enterprises has been sold. Drops in production were severe after the break-up of the Soviet Union in December 1991, but by mid-1995, production began to recover and exports began to increase. The economy is heavily weighted toward gold export and a drop in output at the main Kumtor gold mine sparked a 0.5% decline in GDP in 2002 and a 0.6% decline in 2005.

The government made steady strides in controlling its substantial fiscal deficit, nearly closing the gap between revenues and expenditures in 2006, before boosting expenditures more than 20% in 2007-08. The government and international financial institutions have been engaged in a comprehensive medium-term poverty reduction and economic growth strategy.

Current concerns include: privatization of state-owned enterprises, negative trends in democracy and political freedoms, reduction of corruption, electricity generation, and rising food prices.

[9] World Fact Book, assessed at 17 February 2009.
[10] World Bank at 1 March 2008

V. Assessment Findings

Kyrgyzstan was one of the republics of the former Soviet Union until 1991. After independence, rapid political and economic changes in the country led to a decrease in effectiveness of TB control efforts. As a result, TB incidence and mortality began to increase. After a steady decline in the reported case notification rate which reached 54.8 per 100,000 population in 1993, the case notification rate began to increase. In 2006, Kyrgyzstan, with an estimated TB incidence of 123 per 100,000 population in all forms of TB and 55 per 100,000 among smear positive cases, was among the 15 countries with the highest TB incidence in WHO's European Region (see Table 2 Key indicators of TB control and Figure 1 Surveillance and epidemiology, WHO Global TB Report 2008). TB prevalence was 137 per 100,000 and the TB mortality rate was 18 per 100,000 per year. According to national statistics, more than 600 patients die every year as a result of TB. Since 1999, TB cases diagnosed in places of detention under are included in the total incidence rate.

In 2007, among all 6668 TB cases, 35.5% (2366) were sputum smear positive (see Annex - TB notification and treatment outcome report, Kyrgyzstan). More than 70% of TB patients were between 15 and 65 years old and two-thirds were men, approximately 10% from the penitentiary system. There is no countrywide data on nosocomial TB infection among health care workers or patients. Based on data from Kara-Balta, two health care workers there are diagnosed with TB each year.

1. Tuberculosis Infection Control Policy

The Government started the process of health care reform in 1996 under the Manas National Health Reform Program. A second health sector reform strategy was developed for 2006-2010 – The Kyrgyz Republic National Health Care Reform Program "Manas Taalimi"– which recognizes TB, together with HIV/AIDS, maternal and child health, and the prevention of cardio-vascular diseases, as priority areas of focus.

Implementation of the DOTS strategy started in 1996, with nationwide coverage achieved by 1998. The Government has approved three National TB Programs. The first program was for 1996-2000, the second for 2001-2005, and the current, third, "Tuberculosis-3" was approved in May 2006 for the years 2006-2011. The aim of the "Tuberculosis-3" program is to reduce TB incidence to 90 per 100,000 people and TB mortality to 9 per 100,000 and to establish full control over the TB epidemic in the country. Unfortunately, based on the latest data, the Government has been able to cover only 45% of the funding needs of the TB program.

International organizations supporting TB control in the country have been participating in development of the "Tuberculosis-3" program in order to ensure good coordination and avoid overlapping activities. There are several international organizations working in the country providing technical and financial support, such as KfW (1999-2010), the USAID supported projects from Project HOPE and CDC (2004-2009), the International Committee of the Red Cross (ICRC) (2004-2011), Médecins Sans Frontières (MSF) (2005-2010), GFATM Round 2 and Round 6, and the Kyrgyzstan-Finland Lung Health Program which began implementation in 1999, and is scheduled to continue through 2010.

The National TB Centre under the Ministry of Health of the Kyrgyz Republic is the leading state agency for TB control; it coordinates implementation of the National TB program. The National TB Center coordinates the entire spectrum of TB control activities in accordance with the legislation of the KR. The chief of the National TB Center is also the National Manager of the NTP.

The NTP applied to the Green Light Committee (GLC) for support for second-line TB drugs for DOTS-Plus pilot project in 2004. The first application was for 50 patients in 2004, followed by an expansion by another 50 patients. The last expansion was approved in May 2007 for 1780 patients to be enrolled over a 5 year period (830 patients in the civilian sector and 350 in prisons through GFATM support and 600 patients in civilian and prisons through UNITAID). Kyrgyzstan has been approved for a total of 1880 patients.

2. SES

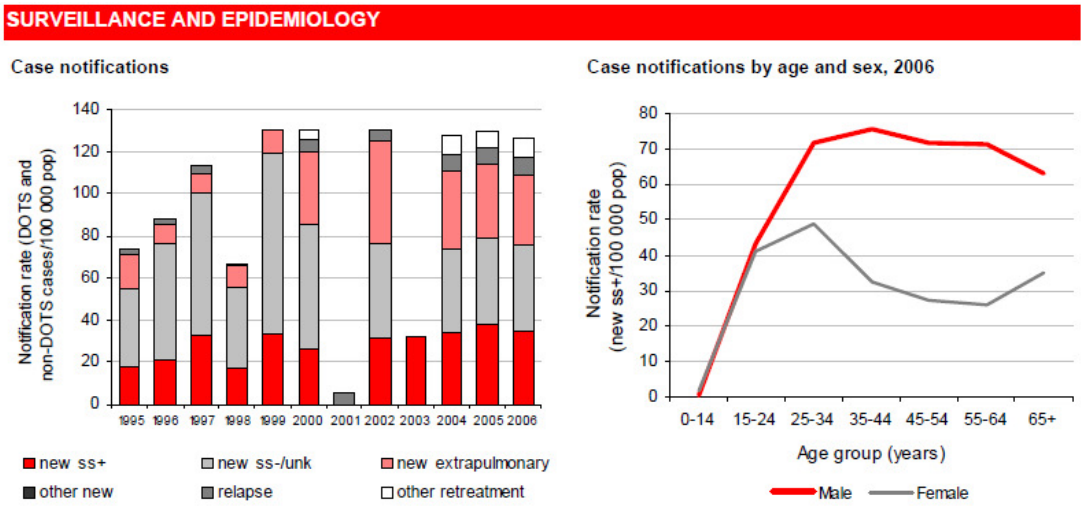
The SES structure is presented in the annexes. Despite attempts over the last three years to reform the SES system, functions and responsibilities remain largely the same as during in Soviet period. The SES is guided by existing Sanitary-Epidemiologic Regulations and Rules, which are not specific to TB infection control given the air-born nature of TB transmission. According to those regulations and rules the SES requires that TB facilities to pay attention to removing visible dust, but no attention is paid to proper ventilation, although UVGI and the surgical masks are recommended.

Table 2 Key indicators of TB control in Kyrgyzstan, WHO Global TB Report 2008

	2006[11] Estimates
The estimated Population	5,258,626
Incidence (all cases/100 000 pop/yr)	123
Incidence (SS+/100 000/yr)	55
Prevalence (all cases/100 000 pop/yr)	137
Mortality (deaths/100 000 pop/yr)	18
Of new TB cases, % HIV+	0.4
Surveillance and DOTS implementation	
Notification rate (new and relapse/100 000 pop/yr)	117
Notification rate (new SS+/100 000 pop/yr)	35
Case detection rate (all new cases, %)	89
Case detection rate (new SS+ cases, %)	63
DOTS treatment success (2005 cohort, %)	85

[11] Global tuberculosis control: surveillance, planning, financing: WHO report 2008. "WHO/HTM/TB/2008.393".

Figure 1 Surveillance and epidemiology in Kyrgyzstan, WHO Global TB Report 2008



3. MDR/XDR-TB

Government analysis of the data from the national drug resistance surveillance carried out in 2007 is not complete. Based on preliminary data, MDR-TB was found in 17.7% of never previously treated patients and in 56.1% of previously treated patients[12]. Due to technical problems, however, the numbers produced by the drug resistance surveillance exercise are not reliable.

Previous surveillance from the civilian sector (mainly from Bishkek and Chui Oblast plus referrals to the National TB Institute) showed a growing trend of MDR-TB infection among previously never treated, and also among previously treated, patients during the period 2003-2005[13] (See Table 3 Drug Resistance 2003-2005). MDR-TB is as transmittable as drug-sensitive TB, but has much reduced chance of cure due to complicated diagnosis and treatment regimens, and the high cost of the drugs.

The national reference laboratory is not doing surveillance of resistance to second-line drugs, so diagnosis of the XDR-TB is not possible. Based on the data from the supranational reference laboratory there were 2 patients diagnosed in 2008 with XDR-TB.

[12] Data source Supranational Reference Laboratory, Borstel, Germany
[13] Data source- National Tuberculsois Programme

Table 3 **MDR-TB profile for civilian sector (mainly from Bishkek and Chui Oblast plus referrals to National TB Institute), National Reference Laboratory, 2002-2005**[14]

	Previous anti-TB treatment status							
	Never treated		Previously treated		Unknown		Total	
	N	%	N	%	N	%	N	%
2002								
H + R	2	0.4	0		0		2	0.3
H + R + E	1	0.2	0		0		1	0.2
H + R + S	28	5.3	11	9.7	0		39	6.1
H + R + E + S	39	7.4	41	36.3	0		80	12.5
Total Multi-Drug Resistance (MDR)	**70**	**13.3**	**52**	**46.0**	**0**		**122**	**19.1**
2003								
H + R	2	0.4	0				2	0.3
H + R + E	1	0.2	0				1	0.1
H + R + S	40	7.1	29	26.4			69	10.3
H + R + E + S	25	4.5	20	18.2			45	6.7
Total Multi-Drug Resistance (MDR)	**68**	**12.1**	**49**	**44.5**	**0**		**117**	**17.5**
2004								
H + R	1	0.1	0				1	0.1
H + R + E	0		1	0.6			1	0.1
H + R + S	68	8.9	32	18.5			100	10.6
H + R + E + S	100	13.0	57	32.9			157	16.7
Total Multi-Drug Resistance (MDR)	**169**	**22.0**	**90**	**52.0**	**0**		**259**	**27.5**
2005								
H + R	2	0.2	1	0.7			3	0.3
H + R + E	5	0.6	0				5	0.5
H + R + S	66	7.9	32	21.1	1	25.0	99	10.0
H + R + E + S	96	11.5	63	41.4			159	16.0
Total Multi-Drug Resistance (MDR)	**169**	**20.2**	**96**	**63.2**	**1**	**25.0**	**266**	**26.8**

[14] Data source- National Tuberculsois Programme

4. TB/HIV co-infection

The National Development Program for Prevention of HIV/AIDS and Other Sexually Transmitted Diseases (2006-2010), along with the national TB program, is one of the four priorities of the Manas Taalimi National Health Care Reform Program.

The first HIV positive case in Kyrgyzstan was notified in 1987. The numbers of HIV-infected persons registered since that time is shown by each year in the annexes of this report. There are 1911 individuals on record as being infected with TB and HIV, including 164 children. HIV testing is done for all TB patients at hospitalization. If the test is positive, the patient is informed and counseled. (Coverage was said to be approximately 99% of smear-positive TB patients). There are 148 patients receiving HAART therapy under a Round 2 GFATM grant, as of 1st of April, 2009.

Collaborative TB/HIV activities

The structure of HIV/AIDS services is presented in the annexes. The collaboration for TB/HIV activities is described in the WHO-based protocols on TB/HIV, adapted by the CAPACITY project and approved by the MOH in April 2008. It is implemented throughout the country. The screening of TB in HIV infected persons is done in TB facilities. According to the recommendation, miniature radiograph investigation (MMR) is done twice a year. Individuals diagnosed with HIV are not routinely rested for TB, although TB patients are routinely tested for HIV.

5. Collaborative TB/ drug abuse dispensary services activities

As with the HIV-AIDS center, the Narcology Center doesn't have TB specialists. It recommends and refers patients with suspected TB to TB facilities. Some patients, such as drug users and homeless people, do not have identification documents and therefore cannot be accepted for MDR treatment by TB facilities.

6. TB Infection Control in Facilities

During the Soviet period, there was limited understanding of the transmission of airborne diseases such as tuberculosis. Therefore, infection control measures in TB were aimed at removal of visible particles such as dirt and dust from surfaces. It was believed that a TB patient can transmit disease via hands and personal belongings. Therefore the home/room of a TB patient was considered contaminated, even if the rooms were well ventilated after the patient was removed from the grounds. Activities to control TB infection were based on disinfecting surfaces in health care facilities and the homes of TB patients.

With the use of modern approaches to TB control (DOTS strategy and later DOTS-Plus), the understanding of TB transmission has deepened. The MOH/NTP applied to GFATM Round 2 for strengthening of IC in TB facilities at the central level. Under GFATM Round 6, the NTP expanded IC activities to province and district level. The NRL and laboratories performing culture and smear microscopy were upgraded. However, despite ambitious plans, the NTP assigns low priority to the TB IC and the refurbishments in the facilities were more for the cosmetic than for IC purpose. Health care personnel were trained at the WHO Collaborating Center on MDR-TB, where part of the training covered IC. No specific training has been provided.

SES has been traditionally the main body regulating and monitoring IC in health care facilities. The NTP does not cooperate with SES on TB IC issues, and SES regulations have not been updated.

In order to strengthen TB IC and decrease nosocomial transmission, urgent actions are needed. They include a revision of the legal framework for TB IC, good cooperation with partners (NTP, SES, MOJ, HIV/AIDS services, international organizations, and others) in development of TB IC guidelines, and IC plans for facilities. The NTP/MOH has to take leading role in this.

Effective TB infection control in health care settings depends on:

- Early diagnosis of potentially infectious tuberculosis (TB) patients
- Separating patients according to their infectiousness, including separation of drug-resistant TB patients from other TB patients. TB and non-TB patients should be strictly separated
- Prompt initiation of appropriate tuberculosis treatment

The primary emphasis of any TB infection control plan should be on achieving these goals[15].

7. Case Finding and Diagnosis

Early case finding and diagnosis of TB is a very effective measure to prevent spread of infection in the society at large but also in health care facilities. The delay to diagnosis could be due to the problems at different levels:

- Patient perspective – coming too late to health care services. The reasons include low awareness of TB disease, stigma, social and financial problems, and other barriers
- Health care perspective – insufficient training in TB, low awareness of TB, clinical misconduct, low quality of TB laboratories, lack of financial resources
- System perspective – administrative, legal, and financial issues

Based on directive № 285 of the Ministry of Health of the Kyrgyz Republic, as of August 30, 2000, primary method of case identification is passive case identification based on self-referral of the persons with symptoms of TB is the. Active case identification is used for screening of risk groups for TB. The case finding is done on two levels:

- Primary health care level (Family Medicine Centers, hospitals, and FAPs)
- Specialized TB services, where patients are referred from the PHC. The patient can go directly to a TB doctor without referral.

According to policy all patients belonging to high risk groups for MDR-TB should receive both culture and drug sensitivity testing (DST). Unfortunately, it is not always done. There is better access to the culture and DST at the central level; patients from rural areas are not always examined for drug-resistance due to various administrative and socio-economic problems.

According to patient questionnaires and interviews with HCWs, it takes an average of 4.5 weeks for a patient to access health services. For first time TB patients it takes an average of 6 weeks from the time of first symptoms, and for previously treated patients it takes an average of 3 weeks. The time varied overall from 1 day to 6 months. Anecdotally, some patients access health care as much as one year after the onset of symptoms. Given these data, patients remain infectious for a long time while they mix in society.

Based on patient questionnaires, more than half of patients preferred a TB or other specialist over a primary health care provider. In terms of diagnostics, in about half of the cases X-rays were the first diagnostic tool. This indicates that the infectiousness of the patient is not considered important, since it cannot be identified by X-ray. The overall diagnostic delay by the health care workers was not longer than one week in re-treatment cases, but longer than one week in new cases. The delay to TB treatment was approximately 2-4 weeks for both previously treated and new cases. Only 6.5 % of infectious TB patients were living alone. Families of TB patients were mostly checked for TB infection.

[15] CDC 2005, WHO 1999, 2006

The majority of patients were not aware of any *recent* contact with TB patients (87%). However, 77% of them had contact with TB patients in the past, although the majority of them were not screened for LTBI at that point.

When performed, the result of sputum smear microscopy is reported to a clinician within 24 hours. The culture result is reported within two months or ten days (depending on the method used) and the DST result is available within three months to three weeks (again depending on the method used). Therefore, a patient with MDR/XDR-TB may stay in the hospital for three or more months without being diagnosed with drug resistant TB, and infecting others.

Rapid diagnostic tests for MDR-TB (ex: biochip, HAIN) allow to diagnosis of resistance to rifampicin and isoniazid in one to three days. This would allow prompt isolation and treatment of MDR/XDR-TB patients, therefore decreasing the time of their infectiousness. These techniques are not used in Kyrgyzstan. MSF is using bio-chip technology from Russian instead, but little is known about this particular technique.

8. TB Treatment

Effective TB infection control in health-care settings depends on:

- Early diagnosis of potentially infectious tuberculosis patients
- Separating patients according to their potential infectiousness, including separation of drug-resistant TB patients from the other TB patients. TB and non-TB patients should also be strictly separated
- Prompt initiation of appropriate anti tuberculosis treatment

The primary emphasis of a TB infection control plan should be on achieving these goals[16].

It is known that once treatment is started, patients will stop being infectious after approximately two weeks[17]. Patients with MDR-TB stay infectious longer. It is also known that by the time a TB case is diagnosed he/she might already have infected close contacts, as a patient with pulmonary TB is infectious for prolonged periods prior to diagnosis (see Table 4).

[16]Centers for Disease Control and Prevention. Guidelines for preventing the transmission of *Mycobacerium tuberculosis* in health-care settings, 2005. MMWR 2005; 54 (RR17).

[16] Tuberculosis Infection Control in the Era of Expanding HIV Care and Treatment. Addendum to WHO Guidelines for the Prevention of Tuberculosis in Health Care Facilities in Resource-Limited Settings, 2006, WHO_TB_99.269_ADD_eng

[16] Guidelines for the prevention of tuberculosis in health care facilities in resource-limited settings, 1999, World Health Organization, WHO/CDS/TB/99.269

[17] Hans L Rieder Epidemiologic Basis of Tuberculosis Control, International Union Against Tuberculosis and Lung Diseases, First edition, 1999;

Table 4 Guidelines for estimating the beginning of the period of infectiousness of persons with TB, by index case characteristic[18]

TB symptoms	AFB sputum smear positive	Cavity Chest radiograph	Recommended minimum beginning of likely period of infectiousness
YES	NO	NO	3 months before symptom onset first positive finding (e.g., abnormal chest radiograph) consistent with TB disease, whichever is longer
YES	YES	YES	3 months before symptom onset or first positive finding consistent with TB disease, whichever is longer
NO	NO	NO	4 weeks before date of suspected diagnosis
NO	YES	YES	3 months before first positive finding consistent with TB

Once a patient with TB is diagnosed in Kyrgyzstan, he/she is hospitalized in a specialized TB facility for the duration of the intensive phase, at least 2-3 months. (see Table 5**)** The treatment of TB can be initiated only by a TB specialist, which causes unnecessary delays in the time to treatment.

[18] SOURCE: California Department of Health Services Tuberculosis Control Branch; California Tuberculosis Controllers Association. Contact investigation guidelines. Berkeley, CA; 1998.

Table 5 TB beds in Kyrgyzstan

Name of institution	Number of beds	For children
I.	II.	III.
National TB Center	430	140
Bishkek	370	120
Chui oblast	330	75
Issyk-Kul oblast	60	-
Naryn oblast	65	20
Talas oblast	120	40
Osh City	100	100
Osh Oblast	570	180
Jalalabat oblast	585	190
Batken oblast	200	30
Republican Rehabilitation Center under NTC for adults "Jety-Oguz "	180	-
Republican Rehabilitation Center under NTC for children in Cholpon-Ata City	150	150
Republican TB Hospital "Kyzyl-Bulak"	100	-
Republican TB Hospital "Kara-Balta"	100	-
Republican TB Hospital "Shekavtar"	130	20
Psychiatric hospitals (TB beds)	70	
Republic TOTAL	3560	1065

- *Civilian TB services*: 99 specialized TB facilities (including TB hospitals and TB units at the PHC) at the republican, oblast and district levels, out of which 37 in-patient facilities with a total capacity of 3,560 beds.
- There are approximately 34,000 medical professionals working in the health care services: 3,561 doctors, 274 phthisiologists, 29,818 nurses.
- *Penitentiary TB services (PS)* **Prisons were not assessed during current assessment.**

TB treatment is provided in two colonies, #31 and #27 and pre-trial detention 1 and also in TB isolation units in every place of detention. In the TB hospital in colony #31 and pre-trial detention 1 sensitive and resistant TB cases are treated. In colony #27 MDR-TB cases are treated. The TB hospital in colony #31 has 150 beds with 19 healthcare workers, the TB hospital in colony #27 has 175 beds for DR-TB patients; there are 23 healthcare workers. There is a fairly good cooperation between the civilian and penitentiary TB services, which is strongly supported by international

organizations (MSF, ICRC). Colony 27 is supported by the ICRC and pre-trial detention 1 and Colony 31 by MSF.

Treatment regimens used in Kyrgyzstan are based on the WHO recommendations, described also in the "Directive of the National TB Center issued for all city and oblast coordinators of the National Program "Tuberculosis" № 01-4-473 as of 15.05.2006."

Treatment course is composed of intensive and continuation phases. The duration of the intensive phase is 2-3 months. Most patients are hospitalized for the intensive phase of treatment, often due to the desire of the administration to ensure income for the hospital, as reimbursement is done per treated case. Unfortunately, since IC measures are poor, TB departments are the most hazardous places from an IC point of view.

The continuation phase lasts four to six months depending on treatment regimen (see Table 5). DOTS is always adhered to during hospital stays, but inconsistently during outpatient treatment, where responsibility is delegated to the PHC. There have been no gaps in FLDs supply during last 5 years

Table 5 Treatment regimens, Kyrgyzstan

Treatment phase	Cat I	Cat II	Cat III
Intensive phase	2HRZE	3HRZES	2HRZE
	3HRZE	4HRZES	
Continuation phase	4H3R3	5H3R3E3	4H3R3E3
	4HR	5HRE	4HRE

In 2007, the treatment success of pulmonary new sputum smear positive TB patients was 84.6 % (1455/1720); 3.9% (67/1720) failed the treatment and 5.9 % (102/1720) defaulted. The treatment success in Tokmok town was 90.9% (30/33), which was higher compared to the whole country; failure rate was 6.0% (2/33) and defaulted 0 (see Table 6). In Karabalta respective rates were 76.7%, 11.6%, and 8.3%

Based on these data one can conclude that the patients failing and defaulting are still spreading infection in the society. (see also Annex 19 Treatment outcome Kyrgyzstan, Tokmok, and Kara-Balta, 2007)

Table 6 Treatment outcome of TB cases in Kyrgyzstan, Kara-Balta, and Tokmok, 2007

Notification and treatment outcome, new SS+, Kara-Balta, 2007													
			Total	Cured	Tx completed	Died	Failed	Def	out	Tx success No	Tx	Tx success %	Not com
New pulmonary SS+	43	17	60	40	6	1	7	5	1	46		76,7	
Notification and treatment outcome, new SS+, Tokmok, 2007													
New pulmonary SS+	21	12	33	30			2		1	30		90,9	
Notification and treatment outcome, new SS+, Kyrgyzsatn, 2007													
New pulmonary SS+			1720	1380	65	57	67	102	31	1455	6	84,6	2

In 2005, a DOTS-Plus pilot project was launched, but SLDs for treatment of MDR-TB are not available for everyone. The NTP with the financial support of the GFATM and UNITAID has planned enrolment of the patients with MDR-TB into the GLC approved project as follows:

	Year 1	Year 2	Year 3	Year 4	Year 5
Civilian (GFATM)	150	200	170	160	150
Prison (GFATM)	50	150	50	50	50
UNITAID	150	250	200		

Since enrollment began in the 4th Quarter of 2005, 464 patients have been treated.

The defaulter rate in the first cohort of MDR-TB patients was extremely high - almost 40%. After that the efforts were made to improve adherence to treatment. In total, the treatment success of the 288 MDR-TB patients is 18.1% (55/288); 57.3% (166/288) are still on treatment. However, 15.3 (44/288) have defaulted and 4.1% failed (12/288), which means that they are likely to spread MDR-TB infection.

Strengths

- FLDs are available and free of charge for the patients. The treatment regimens are in line with international recommendations
- The GLC approved DOTS-Plus, providing some possibility that MDR/XDR-TB can be cured.

- Treatment success was reaching the target - 80% - in Tokmok and Kyrgyzstan overall, which means that the chain of infection is successfully interrupted for drug sensitive TB patients.
- The penitentiary system (PS) collaborates with civilian TB services and the link between PS and civilian TB services has been strengthened with the support of international organizations.

Challenges

- There are not enough SLDs for all patients with MDR-TB. A significant number of patients remain infectious and transmit disease in society at large and in health care facilities.
- The failure and default rates for MDR-TB patients are high.

Recommendations

- Decrease failure and default rates in order to stop the spread of infection in society.
- Ensure that diagnosis and treatment of MDR-TB is accessible for all patients.

TB infection control programs are based on a three-level hierarchy of controls:

- Administrative controls
- Environmental controls
- Respiratory protection controls[19],[20].

A TB risk assessment using the standard TB risk assessment worksheet (see annexes - Risk Assessment Worksheet) was carried out for the TB Unit in the Family Medicine Center (FMC) in Tokmok town, the TB department of the Tokmok Territorial City Hospital, the TB department of the Kara-Balta Branch of the National TB Center, and the TB Unit in the Jayil Rayon FMC located in Kara-Balta City.

Health care facilities in Tokmok

Primary health care facilities in Tokmok

Tokmok town has a population of 64,000. PHC services in the town are concentrated at the Family Medicine Center (FMC).

At the FMC, there is no system of pre-booking. Patients are seen on a first-come first-served basis. The waiting room is crowded at the times when buses arrive from rural areas. There is no practice of prioritizing patients with cough or isolating them from the others while waiting. In case of suspected TB, the family doctors take three sputum smears, and if positive refer the patients to the TB Unit. If the sputum is negative, the approved algorithm for diagnosis and treatment is used. No TB IC measures are taken at the FMC.

[19] Centers for Disease Control and Prevention. Guidelines for preventing the transmission of *Mycobacerium tuberculosis* in health-care settings, 2005. MMWR 2005; 54 (RR17).

[20] Guidelines for the prevention of tuberculosis in health care facilities in resource-limited settings, 1999, World Health Organization, WHO/CDS/TB/99.269

TB suspects and cases should be given face masks or tissues, instructed in cough hygiene, directed to a separate waiting area, receive whatever services they are accessing quickly (ahead of the queue), and then referred to a TB diagnostic and treatment facility.

The town is served by the TB unit which is part of the FMC and is located approximately 50 m from the main building. There is one nurse and one TB doctor receiving approximately 5-7 patients per day. Personnel have not been trained in TB IC. General IC regulations from SES are followed to certain extent, as they are regularly monitored. The rooms were ventilated after a TB patient by opening the windows and switching on the UVGI. Respirators for personnel were not available.

The only TB laboratory performing smears is next to the TB Unit. It is equipped with a Biosafety cabinet class I, but no appropriate respirators were available. The workload is approximately 2-3 smears per day and concordance of test results with the NRL was 100% in 2008. Sputum collection is done outside of the facility.

Strengths

Administrative controls

- The laboratory has shown good performance, which means they could promptly diagnose and begin TB treatment
- Existing IC regulations from SES were available and followed to the extent possible considering financial limitations, and regularly monitored
- The TB Unit is located separately; therefore there were no problems with the patient flow

Environmental controls

- The UVG was available and the rooms mostly well ventilated via windows, except during November - March. As there were few patients in the TB Unit, it is realistic to ventilate the rooms after each use.

Weaknesses

Administrative controls

- The IC regulations are outdated for TB IC and need to be revised
- There was no TB IC plan in the facilities
- Health care personnel have not been trained in TB IC.
- TB patients were mixed in with other patients in crowded waiting rooms in the CFD

Environmental controls

- The rooms were not well ventilated during winter

Personal protection measures

- Respirators were not available for personnel
- The patients were not educated in cough etiquette and hygiene.

Recommendations

- Revise the SES regulations in order to update them with regard to TB IC.

- Develop an TB IC plan for the facilities
- Provide training the health care personnel in TB IC
- Ensure that patients with respiratory symptoms are isolated and prioritized in the waiting rooms of the FMC
- Provide education to patients in cough etiquette and hygiene
- Ensure that the rooms are also well ventilated during winter
- Ensure that the health care personnel are using appropriate respirators (FFP3, FFP2, N95)

TB Department of the Tokmok Territorial City Hospital

Administrative controls

Administrative controls are the most important of the three types of controls. At a minimum, administrative controls include conducting a TB risk assessment for the setting, developing a written TB infection control plan, implementing effective work practices for the management of patients with suspected or confirmed active TB disease, testing, evaluating, and educating healthcare workers, and conducting problem evaluations as needed.

Effective TB infection control in health-care settings depends on:

- Early diagnosis of potentially infectious tuberculosis patients,
- Separating patients according to their potential infectiousness, including separation of drug-resistant TB patients from other TB patients. TB and non-TB patients should be strictly separated.
- Prompt initiation of appropriate tuberculosis treatment;

The primary emphasis of the TB infection control plan should be on achieving these goals[21].

The Central Rayon Hospital (CRH) has 257 beds. A TB department with 50 beds is situated separately about half a mile from the CRH and located in an old hospital for infectious diseases. The department for infectious diseases has 20 beds and is totally separated by a wall from the TB department.

The TB department serves Chui (population 46,000) and Kemin (population 50,000) rayons and Tokmok City (population 64,000). There were only 28 patients at the time of the visit. Personnel are composed of three doctors, ten nurses, and 25 support staff. 230 patients were hospitalized in 2008, 47 (20.4%) were sputum smear positive and 151 (65.6%) were sputum smear negative. The rest, 13.9%, were chronic sputum smear negative patients, which were hospitalized for investigations for administrative reasons to main their disability status.

SES regulations on IC were available in the facility. However, the SES regulations and guidelines do not include many measures specific for TB infection control. There are no regulations on prompt isolation and triage of infectious patients, regulation of patient flow, direction of airflow, or movement of the health care staff. The regulations specific to TB cover only the use of UVGI lights

[21] Centers for Disease Control and Prevention. Guidelines for preventing the transmission of *Mycobacerium tuberculosis* in health-care settings, 2005. MMWR 2005; 54 (RR17).

[21] Tuberculosis Infection Control in the Era of Expanding HIV Care and Treatment. Addendum to WHO Guidelines for the Prevention of Tuberculosis in Health Care Facilities in Resource-Limited Settings, 2006

and face masks. Hence, there is a need to revise SES IC regulations. Newly published TB guidelines do describe safe working conditions in TB laboratories.

A team composed of a nurse and a doctor has been assigned responsibility for infection control in the TB Department. However, there is no IC plan for the facility and specific training in TB IC has not been provided.

The TB department is composed of three separate one-floor buildings. The third one is a storage space and was not accessed (see also Annex 20).

1) Building 1

- Department for sputum smear negative patients with 20 beds. The department has a separate entry from outside. There are 2-5 patients per room.
- A room for patient reception with a separate entry from the outside. This room is separated from the department for sputum smear negative patients by an anteroom. The room does not have a window, therefore no possibility to ventilate. In addition, the doors of the anteroom leading to the department were mostly open.
- Two "AII rooms" for patients with unknown sputum smear status are located in the middle of the building. The rooms are described as AII rooms, but they are no different from the other rooms. To the left of the isolators there are offices for personnel, separated by a door. To the right of the isolation rooms is an anteroom, which leads to the rooms of the sputum smear negative patients. The doors cannot be tightly closed, and in any case they are kept open at all times. Personnel and patients walk back and forth throughout the department.
- Offices for personnel have a separate entry and are separated from the isolation rooms by a door. This door was mainly symbolic and made little contribution to infection control.
- All patients were eating in their rooms, which is good.
- Patients are educated on cough etiquette and hygiene, and provided with masks as needed.

2) Building 2

The second building has one big room with 10 beds, and a separate entry. The room was empty when it was observed. Renovating this part of the building into isolation rooms for patients with unknown status, MDR-TB patients, and a room for screening of the patients was mentioned by personnel. If financial resources were available, this would be a good option.

Further on comes an x-ray department with a separate entry from the outside, completely isolated from the patients' rooms. At the end of the building there was an anteroom and two rooms for sputum smear positive patients with four beds in each. This part has also separate entry from the outside. Ideally, the rooms would not more than two beds in each, as they were small and patients did not like to stay in them.

To summarize, the space is large enough to isolate all patients as needed with better planning. The questionable part is criteria for hospitalization. Sputum smear negative patients can receive treatment in the DOTS facilities (PHC facilities or FAPs) close to their home; they do not need to be hospitalized. If IC measures are not implemented in the facility, then it is the most hazardous place for patients and the personnel.

Strengths

- Health care personnel (doctor and nurse) were assigned responsibility for IC
- Current IC regulations (SES) were available and followed to some extent
- Triage of the patients was done. There were separate departments for infectious and non-infectious TB patients and also isolation rooms

- All categories of patients have separate entries from the outside
- The offices for the personnel are separated from the patients rooms
- Education is provided to the patients in cough hygiene and etiquette
- All patients eat in their rooms

Weaknesses

- The IC team has no TB IC plan or means to enforce it. The existing SES regulations need to be revised with regard to TB IC.
- Patients with unknown infectious status are mixing freely with other patients in the department
- The doors in the hallway between the administration, patient rooms, and isolation rooms are open. Even if closed, the air flows from patients rooms to the administration part through openings around the door.
- Given the level of the implementation of TB IC, the criteria for hospitalization should be revised to decrease the risk of nosocomial infection, particularly during winter.

Recommendations

- Provide the IC team with updated TB IC regulations, appropriate training and means to implement TB IC measures
- Revise the criteria for hospitalization
- Revise the location of rooms for patients with unknown infectious status and the room for screening/reception of the patients. The first step would be to screen patients in the room which has windows – it is currently used as storage room for cleaning staff. As the next step, the isolation rooms and the room for screening/admitting patients could be relocated to the other building and isolation measures should be strengthened there as discussed in the text.

Environmental controls in Tokmok Central Rayon Hospital TB department

Environmental controls prevent the spread and reduce the concentration of droplet nuclei in ambient air. Environmental controls include controlling sources of infection, diluting and removing contaminated air, and controlling airflow.

Environmental controls include the following technologies to remove or inactivate *M.tuberculosis*:

- local exhaust ventilation,
- general ventilation,
- HEPA filtration,
- Ultraviolet germicidal radiation (UVGI)[22] ,[23]

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[22] Centers for Disease Control and Prevention. Guidelines for preventing the transmission of *Mycobacterium tuberculosis* in health-care settings, 2005. MMWR 2005; 54 (RR17).

[23] Guidelines for Environmental Infection Control in Health-Care Facilities: Recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC), MMWR Recomm Rep. 2003 Jun 6;52(RR-10):1-42

The departments have in overall good natural ventilation via open windows, except during winter. The airflow direction is not controlled. A smoke-tube test was performed with closed doors and it was found that the airflow was from the isolation rooms towards the offices of the personnel as there are wide openings around the doors.

There was no window in the patents screening/admission room (see discussion above under the administrative controls). There was one upper UVGI above the door to the patients' side (never cleaned, bulbs said to be maintained regularly). UVGIs were not available in other rooms.

In colder climates where rooms are built to keep temperature adequately high even in winter, natural ventilation takes place by airing via windows at frequent intervals. It is utmost important to keep the door to corridor or other rooms closed, to prevent escape of infectious aerosols to other parts of the facility.

Further, there is likely to be variability of airflow patterns due to varying weather or to the presence of other structures blocking air currents. If ventilation is inadequate, additional mechanical or other measures may be needed, especially in areas where risk of *M. tuberculosis* transmission is high.

Directional airflow. The general ventilation system should be designed and balanced so that air flows from less contaminated (more clean) to more contaminated (less clean) areas. For example, air should flow from corridors (cleaner areas) into AII rooms (less clean areas) to prevent the spread of contaminants.

One method to achieve negative pressure in a room is to add a supplemental exhaust unit. If an AII room has a window or outside wall, a small exhaust fan can be used. The exhaust must not be discharged where it can immediately re-enter the building or pose a hazard to persons outside.

UVGI has been recommended as a supplement or adjunct to other TB infection-control and ventilation measures in settings in which the need to kill or inactivate *M. tuberculosis* is essential. UVGI alone does not provide outside air or circulate interior air, both of which are essential in achieving acceptable air quality in occupied spaces.

Upper-air irradiation. In upper-air irradiation, UVGI lamp fixtures are suspended from the ceiling and installed on walls. The bases of the lamps are shielded to direct the radiation upward and outward to create an intense zone of UVGI in the upper air while minimizing the levels of UVGI in the lower part of the room where the occupants are located. The system depends on air mixing to move the air from the lower part of the room to the upper part where microbial-contaminated air can be irradiated. A major consideration is the placement of UVGI fixtures to achieve sufficient irradiance of the upper-air space. The ceiling should be high enough (>8 feet or 2.4 m) for a substantial volume of upper air to be irradiated without overexposing occupants in the lower part of the room to UVGI. System designers must consider the mechanical ventilation system, room geometry, and emission characteristics of the entire fixture.

Effectiveness of UVGI. Air mixing, air velocity, relative humidity, UVGI intensity, and lamp configuration affect the efficacy of all UVGI applications. For example, with upper-air systems, airborne microorganisms in the lower, occupied areas of the room must move to the upper part of the room to be killed or inactivated by upper-air UVGI. Air mixing can occur through convection caused by temperature differences, fans, location of supply and exhaust ducts, or movement of persons.

Humidity

For optimal efficacy of upper-air UVGI, relative humidity should be maintained at <60%, a level that is consistent with recommendations for providing acceptable indoor air quality and minimizing environmental microbial contamination in indoor environments. In the dry Central Asian environment, this is not a difficult target to meet.

Strength

- Good natural ventilation via open windows during warm times of year

Weaknesses

- The direction of airflow in the buildings was not controlled
- During winter the windows are closed and there is no ventilation at all
- There number of UVGI fixtures was not sufficient (only one available) and the maintenance was not adequate (should be cleaned)
- The patient screening/reception room has no ventilation

Recommendations

- Ensure appropriate ventilation in all room at all times of the year
- Revise the number and maintenance of the UVGIs
- Implement measures to control the airflow in the department (air should flow from clean to dirty rooms; the doors should be closed between departments and isolation rooms). As a first step the patients placed in the isolator should stay there and not walk aground in the department, the doors between the department and the rooms for personnel should be closed and taped to prevent air leakage to the rooms of personnel, and the doors to the anterooms should be closed and airflow controlled.

Respiratory protection controls in the Tokmok Central Rayon Hospital TB Department

Respiratory protection controls further reduce risk of exposure to *M. tuberculosis* in situations that pose a high risk for exposure. Respiratory protection controls include implementation of a respiratory protection program, training of HCWs in respiratory protection, and training patients in respiratory hygiene.

Cough hygiene refers to the following measures: covering the nose and mouth when coughing or sneezing - clients should be given tissues, face masks or scraps of cloth to assist in covering the mouth and nose, the tissues, cloths or masks should be used to contain respiratory secretions, and they should be disposed of in nearby no-touch waste receptacles after use.

There was no respiratory protection program, or training of HCWs in respiratory protection. Appropriate respirators (FFP2, FFP3 or N95) were not available. However, patients are given face masks if they go to x-ray or other diagnostic procedures and they are also educated in cough hygiene.

Strength

- Education is provided to the patients in cough hygiene and etiquette

Weaknesses

- Health care personnel did not use appropriate respirators (FFP2, FFP3 or N95)

- No respiratory protection program or training of HCWs in respiratory protection

Recommendations

- Ensure that there are sufficient number of appropriate respirators for the health care staff (FFP2, FFP3 or N95)
- Implement a respiratory protection program and training for the HCWs in respiratory protection

I. Health care facilities in Kara-Balta

II. 2.1 Family Medicine Center, Kara-Balta

The Family Medicine Center (FMC) in Kara-Balta serves a population of 107,900. The most distant village was said to be 150 km from the FMC. The FMC has a TB Unit with one doctor, one nurse, and one technician. They see patients on four weekdays from 9.00-13.00. There were approximately 15-30 patients per day, some of them mothers with healthy children coming to get a certificate.

Patients are referred to the TB Unit from the FMC and also from village health posts. The PHC doctors or health workers are not allowed to start treatment of TB until it is confirmed by a TB specialist. This can cause significant delay as some patients lack funds to travel to the TB Unit. While delaying treatment they are also spreading infection.

There is a separate entry and well ventilated (via opened windows) waiting room in the TB unit. The doctor's reception room is before the room for the nurse, where patients would receive DOTS care (see also annexes - Layout of the TB Unit in the FMC, Kara-Balta). This may cause problems with TB IC and also confidentiality as both doctor and nurse were working simultaneously. A better arrangement would be to place the doctor's office after the nurse reception room. A door leads from the room of the nurse to the waiting area for family doctors. The door was frequently used.

There was no structure for making appointments, but the nurse was trying to prioritize patients in the waiting room in order to decrease the risk of infection. Mothers with healthy children were recommended to come at specific times to avoid contact with TB patients.

There was one UVGI in doctor's office (bulb changed as required but never cleaned). The rooms were ventilated by opening windows after a suspected or infectious TB patient. The limitations of the UVGI, such as decrease of effectiveness in humid and dusty environments were not known. Because dust settling on a UV lamp prevents bactericidal action, such devices must be wiped once a week with 70% ethanol. Overall, health care personnel were over relying on the UV lights.

The sputum collection unit was separate and situated on the other side of the building, but the sputum was mainly collected outside, in the yard. The nurse was well instructed in IC matters.

None of the health care staff was using appropriate respirators due to a lack of funding, and there was no program for respiratory protection. The personnel were otherwise well trained in TB, but no IC training was provided.

The FMC has a sputum smear laboratory, which is part of the large laboratory and serves the TB Unit and the Central Rayon Hospital. The laboratory technician was newly appointed but well trained. The latest QA round had 95% concordance, and the previous had 100% concordance. The QA was done by the culture lab in the TB Hospital in Kara-Balta.

There have been a few TB cases among the health care staff in the rayon: no cases in 2008, 2 in 2007, and 2 in 2006.

Strengths

- Health care personnel (a doctor and a nurse) were assigned responsibility for the IC
- Current SES IC regulations were available and followed to some extent - funding was the main limitation
- An effort was made to isolate possibly infectious patients within the FMC
- Sputum collection was done outside and personnel well trained
- The sputum smear laboratory was performing well and working under safe conditions
- The doctor in the TB Unit had good knowledge of transmission of TB

Weaknesses

- The IC team has no TB IC plan or means to enforce it. Existing SES regulations need to be revised with regard to TB IC
- The doors to the waiting room of family doctors are opened and used frequently
- The maintenance of the UVGI should be improved
- No program for respiratory protection

Recommendations

- Provide the IC team with updated TB IC regulations, appropriate training and means to implement TB IC measures
- Develop a TB IC program for the FMC
- Consider allowing PHC doctors and medical workers to start treatment of an infectious TB case without confirmation of TB specialist to decrease the time of infectiousness.
- Revise the location of the rooms in the TB Unit. Keep the door to the family doctors' waiting room closed.

2.2 Kara-Balta TB Hospital

Kara-Balta TB hospital serves four rayons:

- Zhailski rayon - population 80,000
- Panfilovski rayon - population 45,000
- Moscowski rayon - population 60,000
- Sukuluk rayon - population 100,000

The total calculated population to be served is 285,000. In reality, only 185,000 people are included because Sukuluk rayon does not send patients to Kara-Balta, as it is situated close to the capital, Bishkek. The TB Hospital was built approximately 50 years ago and has four floors. The actual capacity of the hospital is 100 beds, but the plan is refurbish the hospital for 150 beds.

There are eight doctors and four half time consultants, 26 nurses, 25 support staff, and 20 other staff. In 2008, 498 patients were hospitalized: Cat I, 294, Cat II, 129; Cat III, 15; individualized ; treatment regimen, 46; patients for diagnostic

Administrative controls in Kara-Balta TB Hospital

SES regulations for IC were available and followed as far as possible. However, there was no plan for TB IC or knowledge what a TB IC plan should involve. A nurse was assigned responsibility for regular monitoring of the SES regulations, which she was doing very well.

One wing of the building was renovated, and in that part on every floor there were two rooms with an anteroom and bathroom for patients which were able to pay for better service. The intention had been to create AII rooms in every department, but as currently implemented it is mostly sputum smear negative well off patients housed there in order to separate them from the others. These patients should not have been hospitalized at all, and it was obviously done mainly for the purpose of income for the hospital. These rooms should be used as AII rooms for patients with unknown status of infectiousness or for patients with suspected or known MDR-TB when they are sputum smear positive. There were 14 patients diagnosed with MDR-TB in 2008. With the available six isolators the need for isolation of these patients would be satisfied.

The other part of the wing was for health care personnel and those rooms were somewhat isolated from the patients' rooms by an anteroom. Unfortunately, the openings around the doors were wide and the airflow was not monitored.

The triage of the patients was considered, as there were different floors for sputum smear negative, sputum smear positive new and sputum smear positive re-treatment cases, and chronic patients. However, among the re-treatment and chronic cases there were MDR-TB and non-MDR-TB cases mixed together. It is very important to keep the doors to the corridor and other rooms closed, to prevent escape of infectious aerosols to other parts of the facility. If ventilation is inadequate, additional mechanical or other measures may be needed, especially in areas where risk of M. tuberculosis transmission is high.

a) First Floor
On the first floor there are rooms for the administration and conference rooms, and part of it is for the culture laboratory, which was refurbished with the support of the ICRC one year ago.

b) Second floor
The second floor is for sputum smear negative patients. Natural ventilation via open windows was used. The direction of the air flow was not controlled in the department. The smoke-test was done with closed doors and air was going from the hallway to patient rooms, but it may have been depending on the direction of the wind and the open windows inside the rooms. Rooms were for 2-5 patients. The 24-hour nurse was located in the middle of the hallway without any protection.

Sputum collection was mostly done outside, but recently SES was demanding that the facility establish a sputum collection room in the department. A room next to the doctors' office without any ventilation was assigned for the purpose. The x-ray department is located on this floor, isolated by an anteroom.

Local exhaust ventilation captures airborne contaminants at or near their source and removes contaminants without exposing persons in the area to infectious agents. Two types of hoods are:

1) Enclosing devices, in which the hood either partially or fully encloses the infectious source include:
- booths for sputum induction or administration of aerosolized medications,
- tents or hoods for enclosing and isolating a patient,
- BSCs

The time required to remove 99% or 99.9% of airborne particles from an enclosed space depends on:

- the ACH number, which is a function of the volume of air in the room or booth and the rate at which air is exiting the room or booth at the intake source;
- the location of the ventilation inlet and outlet;

- the configuration of the room or booth.

The third and fourth floors have the same layout as the second floor with the exception of the x-ray department on the second floor. The strength, weaknesses and recommendations apply equally to the second as well as to the third and fourth floor.

Strengths

- A person responsible for IC was appointed
- A sufficient number of isolation rooms were available

Weaknesses

- The person responsible for the IC was not trained in TB IC and was not given resources to implement TB IC measures.
- Isolation rooms were not used according to their purpose
- Patients in the department for sputum smear positive re-treatment and chronic cases were not separated based on their drug resistance pattern.
- Sputum production has been moved from the outside into the facility without proper safety measures
- The 24-hour nurse is not granted safe working conditions

Environmental controls

Environmental controls prevent the spread and reduce the concentration of droplet nuclei in ambient air. Environmental controls include controlling the sources of infection, diluting and removing contaminated air, and controlling airflow. Environmental controls include the following technologies to remove or inactivate M. tuberculosis:

- local exhaust ventilation
- general ventilation
- HEPA filtration
- Ultraviolet germicidal radiation

There was a central ventilation system in the building and it was said to be working, but had not been checked. Therefore the administration had decided to wait before starting it and was hoping to find an engineer who would be able to assess the ventilation system.

Natural ventilation via open windows was used for diluting and removing contaminated air. The windows are open during the warm period of the year. During winter the windows are mostly closed. The patients and health care staff were instructed to open the windows several times a day. The direction of airflow was not controlled. It was found using a smoke tube test that the air was coming through the openings between the doors to the corridor or vice versa depending which door or window was opened at the moment.

In colder climates where rooms are built to keep temperature adequately high even in winter, natural ventilation takes place by via windows at frequent intervals. It is very important to keep the door to the corridor and other rooms closed, to prevent escape of infectious aerosols to other parts of the facility.

There is likely to be variability of airflow patterns due to varying weather or to the presence of other structures blocking air currents. If ventilation is inadequate, additional mechanical or other measures may be needed, especially in areas where risk of M. tuberculosis transmission is high.

Ultraviolet germicidal radiation (UVGI)

UVGI lamps are used in all health care facilities, including TB facilities. The maintenance of the UVGI lamps was not adequate. The lifespan of the bulbs was well followed and the bulbs changed as needed but the bulbs were not cleaned. The number of the UVGI lamps was not insifficient for large spaces - only two UVGIs per hallway in the department. The limitations of the UVGI, such as decrease of effectiveness in humid and dusty environment were not known. Because dust settling on UVGI prevents bactericidal action they must be wiped once a week by 70% ethanol. Overall the health care personnel was over relaying on the UV lights.

UVGI has been recommended as a supplement or adjunct to other TB infection-control and ventilation measures in settings in which the need to kill or inactivate M. tuberculosis is essential. UVGI alone does not provide outside air or circulate interior air, both of which are essential in achieving acceptable air quality in occupied spaces.

Strengths

- Triage of patients is done based on their infectiousness

Weaknesses

- The doors to the rooms were open
- The direction of airflow is not monitored
- The sputum collection room is not safe for sputum collection procedure
- UVGIs were too few in number and the maintenance was pore

Respiratory protection controls

Respiratory protection controls further reduce risk of exposure to M. tuberculosis in situations that pose a high risk for exposure. Respiratory protection controls include implementation of a respiratory protection program, training HCWs in respiratory protection, and training patients in respiratory hygiene.

There was no respiratory protection program, training of the HCWs in respiratory protection, or training of the patients in respiratory hygiene. Patients are given face masks if they go to x-ray or other diagnostic procedures, but patients mostly disregard them. Cough hygiene principles were not followed.

Appropriate respirators (FFP2, FFP3 or N95) were provided in 2007. By the time of this assessment in February 2009 very few respirators were left, and fit-testing had not been carried out. Personnel were also using gauze face masks.

Cleaning of the standard rooms

Rooms were cleaned twice per day to remove visible dust. There was still a belief among the health care workers that the rooms of infectious TB patient, including their home, need to be disinfected. However, respirators were not used when cleaning the rooms of infectious patients, even when patients were present.

Cleaning of the AII rooms

The same cleaning procedures used in other rooms in the health-care setting should be used to clean AII rooms. However, personnel should follow airborne precautions while cleaning these rooms when they are still in use. Personal protective equipment is not necessary during the final cleaning of an AII room after a patient has been discharged if the room has been ventilated for the appropriate amount of time.

Strengths

Some respirators were available for the HC personnel

Weakness

- Appropriate respirators were a scarce commodity and therefore not used as needed
- No respiratory protection program was not implemented
- The education of patients in cough etiquette and hygiene was weak.

The NRL is situated in the National Center for Tuberculosis, Bishkek. It is linked to the SNRL laboratory in Germany. Since 2007, the network of culture laboratories has expanded to 12 laboratories under the Ministry of Health as presented in table 7. The laboratory network has been receiving technical assistance and financial support from the GFATM grants and also from KfW.

Table 7 Bacteriological laboratories in Kyrgyzstan.

№	**Regions**	Quantity	**Center of location**
1.	Bishkek	2	NCPh (NRL)
2.			Municipal TB center
3.	**Chui oblast**	2	TB region center
4.			Kara- Balta territorial hospital
5.	Issyk-Kul oblast	2	TB region center, Kara-Kol city
6.			Kyzyl-Suu village
7.	Naryn oblast	1	TB region center, Naryn city
8.	Talas oblast	1	TB region center, Talas city
9.	Jalal-Abad oblast	3	TB region center, Jalal-Abad city
10.			RRC "Shakavtar"
11.	Osh oblast	1	Municipal TB center, Osh city
12.		2	TB region center, Osh city
13.	Batken oblast	1	TB region center, Batken city

The NRL, supported by the MSF and the ICRC, has been gradually introducing DST for second-line drugs and rapid diagnostics techniques since 2006, but due to technical and personnel problems progress has been slow. Construction of new premises for NRL is planned in the framework of the German government's assistance and was supposed to be finished by 2008, but negotiations are still underway.

Based on a recent monitoring report on behalf of the GLC, the laboratory network lacks an infection control manual and the technical procedures for IC have not been described and distributed to the laboratories. The appropriate respirators are rarely available and when available not used. There has been no training in IC matters for the laboratory personnel.

Recommendations from the GLC monitoring report to the laboratory network with regard to IC were as following:
1. Complete infection control manual for the laboratory.
2. Complete update of infection control and technical procedures to be distributed to all TB centers and laboratories.

Culture Laboratory in the Kara-Balta TB Hospital
The Culture Laboratory in the Kara-Balta TB Hospital was visited. It is not a "typical" TB laboratory as it was recently refurbished with the support of the ICRC. Therefore, IC measures are implemented according to international guidelines, except that the doors between the "dirty" and the "clean" part were opened.

- Biosafety cabinet level I was used to perform the sputum smear
- Biosafety cabinet Level II was used to perform cultures. The Biosafety cabinet class II was with a HEPA-filter (well-maintained). It was planned to add the ventilation to the BSC II but the concern was that the air will be going directly out and might be blown into the x-ray department above the laboratory. However, if the HEPA-filter is properly maintained, there is no major risk.
- The UVGI (BLF x 2) were in the sputum smear preparation room.
- The personnel were wearing appropriate respirators (N95).

The Culture Laboratory in the Kara-Balta TB Hospital is part of the laboratory network in Kyrgyzstan; therefore the same findings pointed out by the GLC monitoring mission were relevant here. The mission also noted that national laboratory standards for bacteriology in TB do not include:

- Description of measures of infection control
- Quality management for lab work
- Workload norms

VI. Recommendations

The main recommendation is to implement and enforce all three levels of TB infection control (administrative, environmental and personal protection measures).

Although many environmental control measures (negative pressure rooms, high efficiency particulate air (HEPA) filters) require resources that are not available in most district level health care facilities, some inexpensive environmental control measures such opening windows to increase natural ventilation and use of fans to control the direction of air flow can be implemented in all settings.

Unless TB IC measures are implemented, the hospitalization of TB patients should be decreased to minimum. Hospitals are currently the most dangerous places for the patients and health care staff due to the high risk of nosocomial infection.

Administrative controls

- Revise the IC program for the facilities based on international recommendations.
- Seek funding to implement and enforce TB infection-control policies
- Ensure that the doors to corridors or other rooms are closed, to prevent escape of infectious aerosols to other parts of the facility
- Ensure adequate isolation and triage of infectious patients in the departments. Infectious patients should not gather in the common. It is recommended to encourage the infectious TB patients (particularly MDR/XDR-TB patients) to not to walk around the facility during hospitalization.
- Ensure that patients are also separated based on their drug resistance pattern

- Ensure that the isolation rooms are used according to their purpose
- Ensure that the 24-hour nurse post is situated in the isolated area with proper ventilation.

Environmental controls

- Use the technical expertise of an engineer to assess existing mechanical ventilation
- Improve the control over the direction of the air-flow in the departments (could be done with simple ventilators installed into the windows and closing the doors, etc) if the existing central ventilation is not adequate.
- If more funds are available, negative pressure ventilation could be planned and installed in high priority "blocks" with high risk of MDR-/XDR-TB or in the whole facility.
- Consult an engineer for proper numbers and location of UVGI in rooms. Implement proper maintenance of the UVGIs.
- If there is no exhaust ventilation in the sputum collection room, it is recommended to continue collection of the sputum outside of the building,

Personal protection measures
- Introduce the respiratory protection controls.
- Provide continuous education to the patients in TB, its transmission, and cough hygiene

Laboratory issues

Work in a TB laboratory exposes laboratory workers to increased risk of infection with M. tuberculosis. Biosafety precautions are paramount in laboratories performing tuberculosis cultures, species identification and testing for drug susceptibility.

The parts of the laboratory where aerosol-generating processes take place should have appropriate mechanical ventilation. Each laboratory should assign an employee as a biosafety officer who designs and implements an infection-control program for the TB laboratory, and continuously evaluates safety at work place starting from safe working practices to monitoring of equipment and follow-up of documented risk situations.

According to international standards, the laboratories doing smear microscopy are allowed to work under biosafety cabinet level I or "on the bench" in the presence of an appropriate ventilation (open window or more sophisticated ventilation system). Culture and DST is should be performed only under biosafety cabinet level II due to risk of MDR/XDR-TB infection.

VII. Conclusions and Next Steps

The Kyrgyz Republic is badly in need of technical and financial support to reduce nosocomial TB infections and reduce the time that people are infectious with tuberculosis and circulating in society. While there is a system in place to identify and treat TB cases, it needs to be strengthened if it is to perform this function effectively.

There are a number of simple steps that can be immediately taken to reduce nosocomial transmission of tuberculosis in Kyrgyzstan. Tuberculosis bacteria travel through the air and are killed by UV rays, so controlling air flow and minimizing the amount of bacteria in the air will reduce transmission of TB. The simplest measures to reduce nosocomial transmission include minimizing the use of aerosol-producing procedures like bronchoscopies, maximizing natural ventilation by opening windows, and teaching patients to cover their mouths when they cough. Ultraviolet light fixtures should be wiped regularly with 70% alcohol to ensure their effectiveness.

The WHO guidelines on tuberculosis treatment do not call for routine patient hospitalization. Hospitalizing SS- patients serves no purpose; they are no longer infectious. Keeping them in the hospital simply exposes them to MDR and XDR TB. Hospitalizing SS+ patients lets them spread bacteria in the confined space of a hospital. They are less likely to infect others outside a residential environment during the brief period they remain infectious. There is some argument for hospitalizing MDR and XDR TB patients in isolation rooms with appropriate airflow; they remain infectious longer and need more provider monitoring of their care. However, patients with drug-sensitive TB should not be routinely hospitalized.

In addition to regulatory reform, the resources devoted to TB need to be substantially increased. Technology such as rapid tests, second-line drugs, HEPA filters, additional UVGI units, personal respirators, and mechanical ventilation would reduce the transmission of TB both in facilities and in society at large.

Questions for Further Research

1) It would be useful to know more about HIV/TB coinfection. Are coinfected patients isolated when hospitalized? What is the treatment success rate for TB in people living with AIDS?

2) More information on diagnostic delay would be valuable. Retreatment cases took three days to be diagnosed, and new cases took over a week to be diagnosed. What are the reasons behind the health system or diagnostic delay? Knowing the reasons for these delays would help in developing recommendations to reduce delays.

3) Treatment default needs to be further explored. Are patients defaulting from primary care or from hospitals? What are their motivations?

VIII. Annex – Risk Assessment Worksheets

Tuberculosis (TB) risk assessment worksheets, Kyrgyzstan

This model worksheet should be considered for use in performing TB risk assessments for health-care settings and nontraditional facility-based settings. Facilities with more than one type of setting will need to apply this table to each setting.

Scoring: Y = Yes N = No NA = Not Applicable

A. Risk Assessment Worksheet National TB Center

1. Incidence of TB	
a. What is the incidence of TB in your community (county or region served by the health-care setting), and how does it compare with the state and national average? * This information can be obtained from the state or local health department. The incidence of TB in your community could be calculated for SS – and SS+ patients separately	**Rate**
b. Are patients with suspected or confirmed TB disease encountered in your setting (inpatient and outpatient)? 1) If yes, how many are treated in your health-care setting in 1 year? (Review laboratory data, infection-control records, and databases containing discharge diagnoses for this information.) 2) If no, does your health-care setting have a plan for the triage of patients with suspected or confirmed TB disease?	**No. patients** **Year** **Suspected** **Confirmed**
c. Currently, does your health-care setting have detected a cluster of persons with tuberculin skin test conversion or patients with active disease with confirmed TB disease during personnel screening or contact investigation or molecular epidemiology studies that might be a result of ongoing transmission of Mycobacterium tuberculosis?	
2. Risk Classification	
a. Inpatient settings	
1) How many inpatient beds are in your inpatient setting?	

2) How many patients with TB disease are encountered in the inpatient setting in 1 year? (Review laboratory data, infection-control records, and databases containing discharge diagnoses.) 3) How many patients with SS+TB disease are encountered in the inpatient setting in 1 year? (Review laboratory data, infection-control records, and databases containing discharge diagnoses.)	
4) Depending on the number of beds and TB patients encountered in 1 year, what is the risk classification for your inpatient setting?	
5) Does your health-care setting have a plan for triaging patients with suspected or confirmed TB disease?	
b. Outpatient settings	
1) How many TB patients are evaluated at your outpatient setting in 1 year? (Review laboratory data, infection-control records, and databases containing discharge diagnoses for this information.)	
2) Is your health-care setting a TB clinic? (If yes, a classification of at least medium risk is recommended) classification?	Y
3) Does evidence exist that a high incidence of TB disease has been observed in the community that the health-care setting serves?	Y
4) Does evidence exist of person-to-person transmission in the health-care setting? (Use information from case reports. Determine if any TST or blood assay for *M.tuberculosis* (BAMT) conversions have occurred among health-care workers.)	Y
5) Does a high incidence of immunocompromised patients or HCWs in the health-care setting exist?	
6) Have patients with drug-resistant TB disease been encountered in your health-care setting within the previous 5 years?	
7) When was the first time a risk classification was done for your health-care setting?	
8) Considering the items above, would your health-care setting need a higher risk	
9) Depending on the number of TB patients evaluated in 1 year, what is the risk classification for your outpatient setting?	
10) Does your health-care setting have a plan for the triage of patients with suspected or confirmed TB disease?	
c. Nontraditional facility-based settings	
1) How many TB patients are encountered at your setting in 1 year?	Previous

	year: _____ _____ 5 years ago_____ _____ __
2) Does evidence exist that a high incidence of TB disease has been observed in the community that the setting serves?	
3) Does evidence exist of person-to-person transmission in the setting?	
4) Have any recent TST or BAMT conversions occurred among staff or clients?	
5) Is there a high incidence or prevalence of immunocompromised patients or HCWs in the setting?	
6) Have patients with drug-resistant TB disease been encountered in your health-care setting within the previous 5 years?	Year encountered
3. Screening of HCWs for M. tuberculosis Infection	
a. Does the health-care setting have a TB screening program for HCWs?	
If yes, which HCWs are included in the TB screening program? (check all that apply) ___ Physicians ___ Mid-level practitioners (nurse practitioners [NP] and physician's assistants [PA]) ___ Nurses ___ Administrators ___ Laboratory workers ___ Respiratory therapists ___ Physical therapists ___ Contract staff ___ Construction or renovation workers ___ Service workers ___ Janitorial staff ___ Maintenance or engineering staff ___ Transportation staff ___ Dietary staff ___ Receptionists ___ Trainees and students ___ Volunteers ___ Others _____	
b. Is baseline skin testing performed with two-step TST for HCWs?	
c. Is baseline testing performed with any other method than TST (ELISPOT or QuantiFERON®-TB or other) for HCWs?	

d. How frequently are HCWs tested for M. tuberculosis infection?	
e. Are M. tuberculosis infection test records maintained for HCWs?	
f. Where are test records for HCWs maintained?	
g. Who maintains the records?	Name: Muhina O., lab specialist
h. If the setting has a serial TB screening program for HCWs to test for M. tuberculosis infection, what are the conversion rates for the previous years?†	
i. Has the test conversion rate for M. tuberculosis infection been increasing or decreasing, or has it remained the same over the previous 5 years? (check one)	
j. Do any areas of the health-care setting (e.g., waiting rooms or clinics) or any group of HCWs (e.g., laboratory workers, emergency department staff, respiratory therapists, and HCWs who attend bronchoscopies) have a test conversion rate for M. tuberculosis infection that exceeds the health-care setting's annual average? If yes, list.	
k. For HCWs who have positive test results for M. tuberculosis infection and who leave employment at the health setting, are efforts made to communicate test results and recommend follow-up of latent TB infection treatment with the local health department or their primary physician?	
4. TB Infection-Control Program	
a. Does the health-care setting have a written TB infection-control plan?	
b. Who is responsible for the infection-control program?	
c. When was the TB infection-control plan first written?	
d. When was the TB infection-control plan last reviewed or updated?	
e. Does the written infection-control plan need to be updated based on the timing of the previous update (i.e., >1 year, changing TB epidemiology of the community or setting, the occurrence of a TB outbreak, change in state or local TB policy, or other factors related to a change in risk for transmission of M. tuberculosis)?	
f. Does the health-care setting have an infection-control committee (or another committee with infection-control responsibilities)?	
1)If yes, which groups are represented on the infection-control committee? (check all that apply)	

_Y_ Physicians _Y_ Nurses _Y_ Epidemiologists _Y__ Engineers _Y_ Pharmacists _Y_ Laboratory personnel ___ Health and safety staff _Y_ Administrator ___ Risk assessment ___ Quality control ___ Others (specify)	
2) If no, what committee is responsible for infection control in the setting?	
5. Implementation of TB Infection-Control Plan Based on Review by Infection-Control Committee	
a. Has a person been designated to be responsible for implementing an infection-control plan in your health-care setting? If yes, list the name.	
b. Based on a review of the medical records, what is the average number of days for the following: _1 day_ Presentation of patient until collection of specimen. _1 day_ Specimen collection until receipt by laboratory. _1 day_ Receipt of specimen by laboratory until smear results are provided to health-care provider. _3 – 7 days_ Diagnosis until initiation of standard antituberculosis treatment. _3 – 7 days _ Receipt of specimen by laboratory until culture results are provided to health-care provider. _1-4 months_ Receipt of specimen by laboratory until drug-susceptibility results are provided to healthcare provider. _1-7 days_ Receipt of drug-susceptibility results until adjustment of antituberculosis treatment, if indicated. _less 10 days_ Admission of patient to hospital until placement in airborne infection isolation (AII).	
c. Through what means (e.g., review of TST or BAMT conversion rates, patient medical records, and time analysis) are lapses in infection control recognized?	
d. What mechanisms are in place to correct lapses in infection control?	
e. Based on measurement in routine QC exercises, is the infection-control plan being properly implemented?	
f. Is ongoing training and education regarding TB infection-control practices provided for HCWs?	
6. Laboratory Processing of TB-Related Specimens, Tests, and	

Results Based on Laboratory Review	
a. Where is the sputum collected in the facility _____ Sputum collection booth --Y-- Out-doors --Y-- Special room with appropriate ventilation ----- Other b. Which of the following tests are either conducted in-house at your health-care setting's laboratory or sent out to a reference laboratory? (check all that apply) **In-house Sent out** __Y_ _____ Acid-fast bacilli (AFB) smears __Y_ _____ Culture using liquid media (e.g., Bactec and MB-BacT) __Y_ _____ Culture using solid media __Y_ _____ Drug-susceptibility testing _____ _____ Nucleic acid amplification testing	
c. What is the usual transport time for specimens to reach the laboratory for the following tests? AFB smears ___1 day___ Culture using liquid media (e.g., Bactec, MB-BacT) ___1 day__ Culture using solid media __2-4 days__ Drug-susceptibility testing _____ Nucleic acid amplification testing _____ Other (specify) _____	
c. Does the laboratory at your health-care setting or the reference laboratory used by your healthcare setting report AFB smear results for all patients within 24 hours of receipt of specimen? What is the procedure for weekends?	
7. Environmental Controls	
a. Which environmental controls are in place in your health-care setting? (check all that apply and describe)	

	Environmental control	Description		
	AII rooms			

	Local exhaust ventilation (enclosing devices and exterior devices)			
	General ventilation (e.g., single-pass system recirculation system)			
	Air-cleaning methods (e.g., high efficiency particulate air [HEPA] filtration and ultraviolet germicidal irradiation [UVGI])			

b. What are the actual air changes per hour (ACH) and design for various rooms in the setting?

NA

Room	ACH	Design		

c. Which of the following local exterior or enclosing devices such as exhaust ventilation devices are used in your health-care setting? (check all that apply)

NA

___ Laboratory hoods

___ Booths for sputum induction

___ Booths for sputum collection

___ Tents or hoods for enclosing patient or procedure

d. What general ventilation systems are used in your health-care setting? (check all that apply)

NA

___ Single-pass system

___ Variable air volume

___ Constant air volume

___ Recirculation system

___ Other _____

_____

e. What air-cleaning methods are used in your health-care setting? (check all that apply)

HEPA filtration	UVGI		
___ Fixed room-air recirculation systems	___ Duct irradiation		
___ Portable room-air recirculation systems	_Y_ Upper-air irradiation		
	_Y_ Portable room-air cleaners		

f. How many AII rooms are in the health-care setting?	Quantity: 0
g. What ventilation methods are used for AII rooms? (check all that apply) Primary: (general ventilation) ___ Single-pass heating, ventilating, and air conditioning (HVAC) ___ Recirculating HVAC systems Secondary (methods to increase equivalent ACH): ___ Fixed room recirculating units ___ HEPA filtration ___ UVGI ___ Other (specify)	NA
h. Does your health-care setting employ, have access to, or collaborate with an environmental engineer (e.g., professional engineer) or other professional with appropriate expertise (e.g., certified industrial hygienist) for consultation on design specifications, installation, maintenance, and evaluation of environmental controls?	N
i. Are environmental controls regularly checked and maintained with results recorded in maintenance logs?	N
j. Is the directional airflow in AII rooms checked daily when in use with smoke tubes or visual checks?	N
k. Are these results readily available?	N
l. What procedures are in place if the AII room pressure is not negative? _____ _____	N
m. Do AII rooms meet the recommended pressure differential of 0.01-inch water column negative to surrounding structures?	N
8. Respiratory-Protection Program	
a. Does your health-care setting have a written respiratory-protection program?	Y
b. Which HCWs are included in the respiratory-protection program? (check all that apply)	

Y	Physicians		Janitorial staff		
Y	Mid-level practitioners (NPs		Maintenance or	engineering staff	

	and PAs)				
Y	Nurses		Transportation	staff	
	Administrators		Dietary staff		
Y	Laboratory personnel		Students		
	Contract staff		Others (specify)		
	Construction or renovation staff				
Y	Service personnel				

c. Are respirators used in this setting for HCWs working with TB patients? If yes, include manufacturer, model, and specific application (e.g., ABC model 1234 for bronchoscopy and DEF model 5678 for routine contact with infectious TB patients).

Manufacturer	Model	Specific	application	
3M	FFP2			
Cimberly Clark	FFP2			
Koyot	FFP2			

d. Is annual respiratory-protection training for HCWs performed by a person with advanced training in respiratory protection?	N
e. Does your health-care setting provide initial fit testing for HCWs? If yes, when is it conducted?	
f. Does your health-care setting provide periodic fit testing for HCWs? If yes, when and how frequently is it conducted?	
g. What method of fit testing is used?	
h. Is qualitative fit testing used?	
i. Is quantitative fit testing used?	
9. Reassessment of TB Risk	
a. How frequently is the TB risk assessment conducted or updated in the health-care setting?	
b. When was the last TB risk assessment conducted?	
c. What problems were identified during the previous TB risk assessment? 1) _____	

_____ _____ _____ 2) _____ _____ _____ _____ 3) _____ _____ _____ _____ 4) _____ _____ _____ _____ 5) _____ _____ _____ _____	
d. What actions were taken to address the problems identified during the previous TB risk assessment? 1) _____ _____ _____ _____ 2) _____ _____ _____ _____ 3) _____ _____ _____	

_____ 4) _____ _____ _____ _____ 5) _____ _____ _____ _____	
e. Did the risk classification need to be revised as a result of the last TB risk assessment?	

1. Incidence of TB	
a. What is the incidence of TB in your community (county or region served by the health-care setting), and how does it compare with the state and national average? * This information can be obtained from the state or local health department. The incidence of TB in your community could be calculated for SS – and SS+ patients separately	**Rate** Community (Rayon): Oblast: National: 100/100,000 SS+ 507, SS- 570
b. Are patients with suspected or confirmed TB disease encountered in your setting (inpatient and outpatient)? 1) If yes, how many are treated in your health-care setting in 1 year? (Review laboratory data, infection-control records, and databases containing discharge diagnoses for this information.) 2) If no, does your health-care setting have a plan for the triage of patients with suspected or confirmed TB disease?	**No. patients** **Year Suspected Confirmed** 1 year ago __32__ __938__ 2 years ago __10___ __886__ 5 years ago _____ __780__ Y, MOH order 452, 466

c. Currently, does your health-care setting have detected a cluster of persons with tuberculin skin test conversion or patients with active disease with confirmed TB disease during personnel screening or contact investigation or molecular epidemiology studies that might be a result of ongoing transmission of Mycobacterium tuberculosis?	N
2. Risk Classification	
a. Inpatient settings	
1) How many inpatient beds are in your inpatient setting?	Quantity: 300
2) How many patients with TB disease are encountered in the inpatient setting in 1 year? (Review laboratory data, infection-control records, and databases containing discharge diagnoses.) 3) How many patients with SS+TB disease are encountered in the inpatient setting in 1 year? (Review laboratory data, infection-control records, and databases containing discharge diagnoses.)	Previous year: 1011 5 years ago: 1300 507
4) Depending on the number of beds and TB patients encountered in 1 year, what is the risk classification for your inpatient setting?	___ Low risk ___ Medium risk _Y_ Potential ongoing transmission
5) Does your health-care setting have a plan for triaging patients with suspected or confirmed TB disease?	Y, MOH order 452, 466
b. Outpatient settings	
1) How many TB patients are evaluated at your outpatient setting in 1 year? (Review laboratory data, infection-control records, and databases containing discharge diagnoses for this information.)	Previous year: 1011 5 years ago: 1300
2) Is your health-care setting a TB clinic? (If yes, a classification of at least medium risk is recommended) classification?	Y
3) Does evidence exist that a high incidence of TB disease has been observed in the community that the health-care setting serves?	Y
4) Does evidence exist of person-to-person transmission in the health-care setting? (Use information from case reports. Determine if any TST or blood assay for *M.tuberculosis* (BAMT) conversions have occurred among health-care workers.)	Y for fluorography
5) Does a high incidence of immunocompromised patients or HCWs in the health-care setting exist?	
6) Have patients with drug-resistant TB disease been encountered in your health-care setting within the previous 5 years?	Year encountered: from 2006
7) When was the first time a risk classification was done for your	Date of

health-care setting?	classification: NA
8) Considering the items above, would your health-care setting need a higher risk	Y
9) Depending on the number of TB patients evaluated in 1 year, what is the risk classification for your outpatient setting?	___ Low risk ___ Medium risk _Y_ Potential ongoing transmission
10) Does your health-care setting have a plan for the triage of patients with suspected or confirmed TB disease?	Y, MOH order 452, 466
c. Nontraditional facility-based settings	
1) How many TB patients are encountered at your setting in 1 year?	Previous year: _____ 5 years ago_____
2) Does evidence exist that a high incidence of TB disease has been observed in the community that the setting serves?	
3) Does evidence exist of person-to-person transmission in the setting?	
4) Have any recent TST or BAMT conversions occurred among staff or clients?	
5) Is there a high incidence or prevalence of immunocompromised patients or HCWs in the setting?	
6) Have patients with drug-resistant TB disease been encountered in your health-care setting within the previous 5 years?	Year encountered
3. Screening of HCWs for M. tuberculosis Infection	
a. Does the health-care setting have a TB screening program for HCWs?	Y (fluorography)
If yes, which HCWs are included in the TB screening program? (check all that apply)	

__Y_ Physicians __Y_ Mid-level practitioners (nurse practitioners [NP] and physician's assistants [PA]) __Y_ Nurses __Y_ Administrators __Y_ Laboratory workers ___ Respiratory therapists ___ Physical therapists ___ Contract staff ___ Construction or renovation workers	__Y_ Service workers __Y_ Janitorial staff __Y_ Maintenance or engineering staff __Y_ Transportation staff __Y_ Dietary staff __Y_ Receptionists ___ Trainees and students ___ Volunteers ___ Others _School teachers_____	
b. Is baseline skin testing performed with two-step TST for HCWs?		N
c. Is baseline testing performed with any other method than TST (ELISPOT or QuantiFERON®-TB or other) for HCWs?		N
d. How frequently are HCWs tested for M. tuberculosis infection?		Frequency: *fluorography once a year*
e. Are M. tuberculosis infection test records maintained for HCWs?		
f. Where are test records for HCWs maintained?		Location: *archive*
g. Who maintains the records?		Name: Temiraliev S., X-ray specialist
h. If the setting has a serial TB screening program for HCWs to test for M. tuberculosis infection, what are the conversion rates for the previous years?†		1 year ago: 1 based on fluorography 2 years ago: 1 based on fluorography 3 years ago: 0 4 years ago: 0 5 years ago: 0
i. Has the test conversion rate for M. tuberculosis infection been increasing or decreasing, or has it remained the same over the previous 5 years? (check one)		_Y_ Increasing ___ Decreasing ___ No change in prev. 5 years

j. Do any areas of the health-care setting (e.g., waiting rooms or clinics) or any group of HCWs (e.g., laboratory workers, emergency department staff, respiratory therapists, and HCWs who attend bronchoscopies) have a test conversion rate for M. tuberculosis infection that exceeds the health-care setting's annual average? If yes, list.	Rate: NA
k. For HCWs who have positive test results for M. tuberculosis infection and who leave employment at the health setting, are efforts made to communicate test results and recommend follow-up of latent TB infection treatment with the local health department or their primary physician?	Y
4. TB Infection-Control Program	
a. Does the health-care setting have a written TB infection-control plan?	Y based on MOH order #349
b. Who is responsible for the infection-control program?	Name: Aljanova, nurse
c. When was the TB infection-control plan first written?	Date: 2005
d. When was the TB infection-control plan last reviewed or updated?	Date: 2009
e. Does the written infection-control plan need to be updated based on the timing of the previous update (i.e., >1 year, changing TB epidemiology of the community or setting, the occurrence of a TB outbreak, change in state or local TB policy, or other factors related to a change in risk for transmission of M. tuberculosis)?	Y
f. Does the health-care setting have an infection-control committee (or another committee with infection-control responsibilities)?	Y
1)If yes, which groups are represented on the infection-control committee? (check all that apply) _Y_ Physicians _Y_ Nurses ___ Epidemiologists ___ Engineers ___ Pharmacists _Y_ Laboratory personnel ___ Health and safety staff _Y_ Administrator ___ Risk assessment _Y_ Quality control ___ Others (specify)	
2) If no, what committee is responsible for infection control in the setting?	Committee
5. Implementation of TB Infection-Control Plan Based on Review by Infection-Control Committee	
a. Has a person been designated to be responsible for implementing an infection-control plan in your health-care setting? If yes, list the	Name: Aljanova, nurse

name.	
b. Based on a review of the medical records, what is the average number of days for the following: _1 day_ Presentation of patient until collection of specimen. _1 day_ Specimen collection until receipt by laboratory. _1 day_ Receipt of specimen by laboratory until smear results are provided to health-care provider. _3 – 7 days_ Diagnosis until initiation of standard antituberculosis treatment. _3 – 7 days _ Receipt of specimen by laboratory until culture results are provided to health-care provider. _1-4 months_ Receipt of specimen by laboratory until drug-susceptibility results are provided to healthcare provider. _1-7 days_ Receipt of drug-susceptibility results until adjustment of antituberculosis treatment, if indicated. _less 10 days_ Admission of patient to hospital until placement in airborne infection isolation (AII).	
c. Through what means (e.g., review of TST or BAMT conversion rates, patient medical records, and time analysis) are lapses in infection control recognized?	Means: All listed except skin test
d. What mechanisms are in place to correct lapses in infection control?	Mechanisms: administrative
e. Based on measurement in routine QC exercises, is the infection-control plan being properly implemented?	Y
f. Is ongoing training and education regarding TB infection-control practices provided for HCWs?	Y
6. Laboratory Processing of TB-Related Specimens, Tests, and Results Based on Laboratory Review	
a. Where is the sputum collected in the facility _____ Sputum collection booth --Y-- Out-doors -- -- Special room with appropriate ventilation ---Y—Other: separate room b. Which of the following tests are either conducted in-house at your health-care setting's laboratory or sent out to a reference laboratory? (check all that apply) **In-house Sent out**	

__Y_ ____ Acid-fast bacilli (AFB) smears __Y_ ____ Culture using liquid media (e.g., Bactec and MB-BacT) ____ ____ Culture using solid media __Y_ ____ Drug-susceptibility testing ____ ____ Nucleic acid amplification testing	
c. What is the usual transport time for specimens to reach the laboratory for the following tests? AFB smears ___1 day___ Culture using liquid media (e.g., Bactec, MB-BacT) ___1 day__ Culture using solid media __2-4 days__ Drug-susceptibility testing ___3-4 months____ Nucleic acid amplification testing _____ Other (specify) _____	
c. Does the laboratory at your health-care setting or the reference laboratory used by your healthcare setting report AFB smear results for all patients within 24 hours of receipt of specimen? What is the procedure for weekends?	Y Does not work
7. Environmental Controls	
a. Which environmental controls are in place in your health-care setting? (check all that apply and describe)	

	Environmental control		Description	
	AII rooms			
Y	Local exhaust ventilation (enclosing devices and exterior devices)	*Small ventilators installed at upper corner of the*	*windows*	
	General ventilation (e.g., single-pass system recirculation system)	*General ventilation system does not work.*		
	Air-cleaning methods (e.g., high efficiency particulate air [HEPA] filtration and ultraviolet germicidal irradiation [UVGI])			

b. What are the actual air changes per hour (ACH) and design for various rooms in the setting?

NA

Room	ACH		Design	

c. Which of the following local exterior or enclosing devices such as exhaust ventilation devices are used in your health-care setting? (check all that apply) ___ Laboratory hoods ___ Booths for sputum induction ___ Booths for sputum collection ___ Tents or hoods for enclosing patient or procedure	NA
d. What general ventilation systems are used in your health-care setting? (check all that apply) ___ Single-pass system ___ Variable air volume ___ Constant air volume ___ Recirculation system ___Other _____ _____	NA
e. What air-cleaning methods are used in your health-care setting? (check all that apply)	

HEPA filtration	UVGI		
___ Fixed room-air recirculation systems	___ Duct irradiation		
___ Portable room-air recirculation systems	_Y_ Upper-air irradiation		
	_Y_ Portable room-air cleaners		

f. How many AII rooms are in the health-care setting?	Quantity: 0
g. What ventilation methods are used for AII rooms? (check all that apply) Primary: (general ventilation) ___ Single-pass heating, ventilating, and air conditioning (HVAC) ___ Recirculating HVAC systems Secondary (methods to increase equivalent ACH): ___ Fixed room recirculating units ___ HEPA filtration	NA

___ UVGI ___ Other (specify)	
h. Does your health-care setting employ, have access to, or collaborate with an environmental engineer (e.g., professional engineer) or other professional with appropriate expertise (e.g., certified industrial hygienist) for consultation on design specifications, installation, maintenance, and evaluation of environmental controls?	Y
Are environmental controls regularly checked and maintained with results recorded in maintenance logs?	N
j. Is the directional airflow in AII rooms checked daily when in use with smoke tubes or visual checks?	N
k. Are these results readily available?	N
l. What procedures are in place if the AII room pressure is not negative? _____ _____	N
m. Do AII rooms meet the recommended pressure differential of 0.01-inch water column negative to surrounding structures?	NA
8. Respiratory-Protection Program	
a. Does your health-care setting have a written respiratory-protection program?	Y
b. Which HCWs are included in the respiratory-protection program? (check all that apply)	

Y	Physicians		Janitorial staff		
Y	Mid-level practitioners (NPs and PAs)		Maintenance or engineering staff		
Y	Nurses		Transportation staff		
	Administrators		Dietary staff		
Y	Laboratory personnel		Students		
	Contract staff		Others (specify)		
	Construction or renovation staff				
Y	Service personnel				

c. Are respirators used in this setting for HCWs working with TB patients? If yes, include manufacturer, model, and specific application (e.g., ABC model 1234 for bronchoscopy and DEF model	

5678 for routine contact with infectious TB patients). | Manufacturer	Model	Specific application | |---|---|---| | 3M | FFP2 | | | | | | | | | | | | | | | | | |	
d. Is annual respiratory-protection training for HCWs performed by a person with advanced training in respiratory protection?	
e. Does your health-care setting provide initial fit testing for HCWs? If yes, when is it conducted?	
f. Does your health-care setting provide periodic fit testing for HCWs? If yes, when and how frequently is it conducted?	
g. What method of fit testing is used?	
h. Is qualitative fit testing used?	
i. Is quantitative fit testing used?	
9. Reassessment of TB Risk	
a. How frequently is the TB risk assessment conducted or updated in the health-care setting?	
b. When was the last TB risk assessment conducted?	
c. What problems were identified during the previous TB risk assessment? 1) _____ _____ _____ _____ 2) _____ _____ _____ _____ 3) _____ _____ _____	

_____ 4) _____ _____ _____ _____ 5) _____ _____ _____ _____	
d. What actions were taken to address the problems identified during the previous TB risk assessment? 1) _____ _____ _____ _____ 2) _____ _____ _____ _____ 3) _____ _____ _____ _____ 4) _____ _____ _____ _____ 5) _____ _____ _____ _____	
e. Did the risk classification need to be revised as a result of the last TB risk assessment?	

B. Risk Assessment Worksheet TB unit, Kara-Balta FMC

1. Incidence of TB	
a. What is the incidence of TB in your community (county or region served by the health-care setting), and how does it compare with the state and national average? * This information can be obtained from the state or local health department. The incidence of TB in your community could be calculated for SS – and SS+ patients separately	**Rate** Community (Rayon): 160 patients/year or 150/100,000 a year Oblast: 145/100,000 National: 105/100,000
b. Are patients with suspected or confirmed TB disease encountered in your setting (inpatient and outpatient)? 1) If yes, how many are treated in your health-care setting in 1 year? (Review laboratory data, infection-control records, and databases containing discharge diagnoses for this information.) 2) If no, does your health-care setting have a plan for the triage of patients with suspected or confirmed TB disease?	**No. patients** **Year Suspected Confirmed** 1 year ago 440 160 2 years ago 300-400 200 5 years ago 300-400 110 Based on Algorithm
c. Currently, does your health-care setting have detected a cluster of persons with tuberculin skin test conversion or patients with active disease with confirmed TB disease during personnel screening or contact investigation or molecular epidemiology studies that might be a result of ongoing transmission of Mycobacterium tuberculosis?	Y for patients, N for HCW
2. Risk Classification	
a. Inpatient settings	
1) How many inpatient beds are in your inpatient setting?	Quantity
2) How many patients with TB disease are encountered in the inpatient setting in 1 year? (Review laboratory data, infection-control records, and databases containing discharge diagnoses.) 3) How many patients with SS+TB disease are encountered in the inpatient setting in 1 year? (Review laboratory data, infection-control records, and databases containing discharge diagnoses.)	Previous year: 5 years ago:

4) Depending on the number of beds and TB patients encountered in 1 year, what is the risk classification for your inpatient setting?	___ Low risk ___ Medium risk ___ Potential ongoing transmission
5) Does your health-care setting have a plan for triaging patients with suspected or confirmed TB disease?	
b. Outpatient settings	
1) How many TB patients are evaluated at your outpatient setting in 1 year? (Review laboratory data, infection-control records, and databases containing discharge diagnoses for this information.)	Previous year: 440 5 years ago: 326
2) Is your health-care setting a TB clinic? (If yes, a classification of at least medium risk is recommended) classification?	TB unit – Y, FMC - N
3) Does evidence exist that a high incidence of TB disease has been observed in the community that the health-care setting serves?	There is a grow of incidence from year 1998
4) Does evidence exist of person-to-person transmission in the health-care setting? (Use information from case reports. Determine if any TST or blood assay for *M.tuberculosis* (BAMT) conversions have occurred among health-care workers.)	N
5) Does a high incidence of immunocompromised patients or HCWs in the health-care setting exist?	No HCW, patients with HIV grow (2 in 2005, 1 in 2006, 1 in 2007, 4 in 2008)
6) Have patients with drug-resistant TB disease been encountered in your health-care setting within the previous 5 years?	Year encountered: 69 in 2005, 39 in 2007, 43 in 2008
7) When was the first time a risk classification was done for your health-care setting?	Date of classification: NA
8) Considering the items above, would your health-care setting need a higher risk	
9) Depending on the number of TB patients evaluated in 1 year, what is the risk classification for your outpatient setting?	___ Low risk _Y__ Medium risk ___ Potential ongoing transmission
10) Does your health-care setting have a plan for the triage of patients with suspected or confirmed TB disease?	Y, based on algorithm
c. Nontraditional facility-based settings	
1) How many TB patients are encountered at your setting in 1 year?	Previous year

	_____ 5 years ago_____
2) Does evidence exist that a high incidence of TB disease has been observed in the community that the setting serves?	
3) Does evidence exist of person-to-person transmission in the setting?	
4) Have any recent TST or BAMT conversions occurred among staff or clients?	
5) Is there a high incidence or prevalence of immunocompromised patients or HCWs in the setting?	
6) Have patients with drug-resistant TB disease been encountered in your health-care setting within the previous 5 years?	Year encountered
3. Screening of HCWs for M. tuberculosis Infection	
a. Does the health-care setting have a TB screening program for HCWs?	Y (fluorography)
If yes, which HCWs are included in the TB screening program? (check all that apply) _Y_ Physicians _Y_ Mid-level practitioners (nurse practitioners [NP] and physician's assistants [PA]) _Y_ Nurses ___ Administrators _Y_ Laboratory workers _Y_ Respiratory therapists _Y_ Physical therapists ___ Contract staff ___ Construction or renovation workers ___ Service workers _Y_ Janitorial staff ___ Maintenance or engineering staff ___ Transportation staff ___ Dietary staff ___ Receptionists ___ Trainees and students ___ Volunteers ___ Others _____	
b. Is baseline skin testing performed with two-step TST for HCWs?	N (but on fluorography)
c. Is baseline testing performed with any other method than TST (ELISPOT or QuantiFERON®-TB or other) for HCWs?	N
d. How frequently are HCWs tested for M. tuberculosis infection?	Frequency: NA (fluorography once a year)

e. Are M. tuberculosis infection test records maintained for HCWs?	NA (Y for fluorography)
f. Where are test records for HCWs maintained?	Location: NA for tuberculin test, fluorography in database
g. Who maintains the records?	Name: R-physician, Krasnokutskiy N.N.
h. If the setting has a serial TB screening program for HCWs to test for M. tuberculosis infection, what are the conversion rates for the previous years?† - *NA for tuberculin test, but through fluorography. All contacts are outside from health facility*	1 year ago: N 2 years ago: 2 3 years ago: 2 4 years ago: 3 5 years ago: 2
Has the test conversion rate for M. tuberculosis infection been increasing or decreasing, or has it remained the same over the previous 5 years? (check one) - *NA for tuberculin test, but through fluorography*	_Y_ Increasing ___ Decreasing ___ No change in prev. 5 years
j. Do any areas of the health-care setting (e.g., waiting rooms or clinics) or any group of HCWs (e.g., laboratory workers, emergency department staff, respiratory therapists, and HCWs who attend bronchoscopies) have a test conversion rate for M. tuberculosis infection that exceeds the health-care setting's annual average? If yes, list.	Rate
k. For HCWs who have positive test results for M. tuberculosis infection and who leave employment at the health setting, are efforts made to communicate test results and recommend follow-up of latent TB infection treatment with the local health department or their primary physician?	Y
4. TB Infection-Control Program	
a. Does the health-care setting have a written TB infection-control plan?	N
b. Who is responsible for the infection-control program?	Name: NA
c. When was the TB infection-control plan first written?	Date: NA
d. When was the TB infection-control plan last reviewed or updated?	Date: NA
e. Does the written infection-control plan need to be updated based on the timing of the previous update (i.e., >1 year, changing TB epidemiology of the community or setting, the occurrence of a TB outbreak, change in state or local TB policy, or other factors related to a change in risk for transmission of M. tuberculosis)?	Y
f. Does the health-care setting have an infection-control committee (or another committee with infection-control responsibilities)?	FMC Infectionist

1)If yes, which groups are represented on the infection-control committee? (check all that apply) _Y_ Physicians _Y_ Nurses ___ Epidemiologists ___ Engineers ___ Pharmacists ___ Laboratory personnel ___ Health and safety staff ___ Administrator ___ Risk assessment ___ Quality control ___ Others (specify)	
2) If no, what committee is responsible for infection control in the setting?	Committee: NA
5. Implementation of TB Infection-Control Plan Based on Review by Infection-Control Committee	
a. Has a person been designated to be responsible for implementing an infection-control plan in your health-care setting? If yes, list the name.	Name: infectionist
b. Based on a review of the medical records, what is the average number of days for the following: __1 min-1hour__ Presentation of patient until collection of specimen. __1 min-3 hours__ Specimen collection until receipt by laboratory. __5 -10 min __ Receipt of specimen by laboratory until smear results are provided to health-care provider. __5 min-several days__ Diagnosis until initiation of standard antituberculosis treatment. _NA_ Receipt of specimen by laboratory until culture results are provided to health-care provider. _Once a quarter__ Receipt of specimen by laboratory until drug-susceptibility results are provided to healthcare provider. __NA__ Receipt of drug-susceptibility results until adjustment of antituberculosis treatment, if indicated. __1 hour-1 year__ Admission of patient to hospital until placement in airborne infection isolation (AII).	
c. Through what means (e.g., review of TST or BAMT conversion rates, patient medical records, and time analysis) are lapses in infection control recognized?	Means: NA
d. What mechanisms are in place to correct lapses in infection control?	Mechanisms: N
e. Based on measurement in routine QC exercises, is the infection-control plan being properly implemented?	Y, based on old regulations

f. Is ongoing training and education regarding TB infection-control practices provided for HCWs?	N
6. Laboratory Processing of TB-Related Specimens, Tests, and Results Based on Laboratory Review	
a. Where is the sputum collected in the facility _____ Sputum collection booth ---Y-- Out-doors ---Y-- Special room with appropriate ventilation ----- Other b. Which of the following tests are either conducted in-house at your health-care setting's laboratory or sent out to a reference laboratory? (check all that apply) **In-house Sent out** __Y_ _____ Acid-fast bacilli (AFB) smears _____ _____ Culture using liquid media (e.g., Bactec and MB-BacT) _____ _____ Culture using solid media _____ _____ Drug-susceptibility testing _____ _____ Nucleic acid amplification testing	
c. What is the usual transport time for specimens to reach the laboratory for the following tests? AFB smears - *immediately*__ Culture using liquid media (e.g., Bactec, MB-BacT) _____ Culture using solid media _____ Drug-susceptibility testing _____ Nucleic acid amplification testing _____ Other (specify) _____	
c. Does the laboratory at your health-care setting or the reference laboratory used by your healthcare setting report AFB smear results for all patients within 24 hours of receipt of specimen? What is the procedure for weekends? –	Y *For weekends accepted on Mondays*
7. Environmental Controls	
a. Which environmental controls are in place in your health-care setting? (check all that apply and describe)	

	Environmental control	Description	
	AII rooms		
	Local exhaust ventilation (enclosing devices and exterior devices)	N	
	General ventilation (e.g., single-pass system recirculation system)	Y, *natural ventilation via open windows and doors*	
	Air-cleaning methods (e.g., high efficiency particulate air [HEPA] filtration and ultraviolet germicidal irradiation [UVGI])	UVGI	

b. What are the actual air changes per hour (ACH) and design for various rooms in the setting?

NA, was not measured

Room	ACH	Design	

c. Which of the following local exterior or enclosing devices such as exhaust ventilation devices are used in your health-care setting? (check all that apply)

Rooms for sputum collection

___ Laboratory hoods

___ Booths for sputum induction

___ Booths for sputum collection

___ Tents or hoods for enclosing patient or procedure

d. What general ventilation systems are used in your health-care setting? (check all that apply)

___ Single-pass system

___ Variable air volume

___ Constant air volume

___ Recirculation system

_Y_ Other: *natural ventilation*_____

e. What air-cleaning methods are used in your health-care setting?

<table>
<tr><td>(check all that apply)

<table><tr><td>HEPA filtration: N</td><td>UVGI</td></tr><tr><td>___ Fixed room-air recirculation systems</td><td>___ Duct irradiation</td></tr><tr><td>___ Portable room-air recirculation systems</td><td>_Y_ Upper-air irradiation</td></tr><tr><td></td><td>_Y_ Portable room-air cleaners</td></tr></table></td><td></td></tr>
<tr><td>f. How many AII rooms are in the health-care setting?</td><td>Quantity: NA</td></tr>
<tr><td>g. What ventilation methods are used for AII rooms? (check all that apply)

Primary: (general ventilation)

___ Single-pass heating, ventilating, and air conditioning (HVAC)

___ Recirculating HVAC systems

Secondary (methods to increase equivalent ACH):

___ Fixed room recirculating units

___ HEPA filtration

_Y_ UVGI

___ Other

(specify)</td><td>NA</td></tr>
<tr><td>h. Does your health-care setting employ, have access to, or collaborate with an environmental engineer (e.g., professional engineer) or other professional with appropriate expertise (e.g., certified industrial hygienist) for consultation on design specifications, installation, maintenance, and evaluation of environmental controls?</td><td>N</td></tr>
<tr><td>i. Are environmental controls regularly checked and maintained with results recorded in maintenance logs?</td><td>N</td></tr>
<tr><td>j. Is the directional airflow in AII rooms checked daily when in use with smoke tubes or visual checks?</td><td>N</td></tr>
<tr><td>k. Are these results readily available?</td><td>NA</td></tr>
<tr><td>l. What procedures are in place if the AII room pressure is not negative?

_____
_____</td><td>NA</td></tr>
<tr><td>m. Do AII rooms meet the recommended pressure differential of 0.01-inch water column negative to surrounding structures?</td><td>NA</td></tr>
<tr><td>8. Respiratory-Protection Program</td><td></td></tr>
<tr><td>a. Does your health-care setting have a written respiratory-protection program?</td><td>N</td></tr>
</table>

b. Which HCWs are included in the respiratory-protection program? (check all that apply)

Y	Physicians		Janitorial staff
	Mid-level practitioners (NPs and PAs)		Maintenance or engineering staff
Y	Nurses		Transportation staff
	Administrators		Dietary staff
Y	Laboratory personnel		Students
	Contract staff		Others (specify)
	Construction or renovation staff		
	Service personnel		

c. Are respirators used in this setting for HCWs working with TB patients? If yes, include manufacturer, model, and specific application (e.g., ABC model 1234 for bronchoscopy and DEF model 5678 for routine contact with infectious TB patients).

Manufacturer	Model	Specific application
Local "Cholpon" factory		

d. Is annual respiratory-protection training for HCWs performed by a person with advanced training in respiratory protection?	N
e. Does your health-care setting provide initial fit testing for HCWs? If yes, when is it conducted?	Date: N
f. Does your health-care setting provide periodic fit testing for HCWs? If yes, when and how frequently is it conducted?	N
g. What method of fit testing is used?	Method: NA
h. Is qualitative fit testing used?	
i. Is quantitative fit testing used?	
9. Reassessment of TB Risk	
a. How frequently is the TB risk assessment conducted or updated in the	Frequency: NA

health-care setting?	
b. When was the last TB risk assessment conducted?	Date: NA
c. What problems were identified during the previous TB risk assessment? 1) Facility does not have proper ventilation system _____ 2) There is no training on IC_____ 3) The quality of respirators is unknown _____ 4) _____ 5) _____	
d. What actions were taken to address the problems identified during the previous TB risk assessment? 1) _____ 2) _____ 3) _____ 4) _____ 5) _____	NA
e. Did the risk classification need to be revised as a result of the last TB risk assessment?	

- If the population served by the health-care facility is not representative of the community in which the facility is located, an alternate comparison population might be appropriate. †Test conversion rate is calculated by dividing the number of conversions among HCWs by the number of HCWs who had previous negative results during a certain period.

C. Risk Assessment Worksheet - TB Hospital in Kara-Balta

1. Incidence of TB	
a. What is the incidence of TB in your community (county or region served by the health-care setting), and how does it compare with the state and national average? * This information can be obtained from the state or local health department. The incidence of TB in your community could be calculated for SS – and SS+ patients separately	**Rate** Community (Rayon): 169,5/100,000 Oblast: 158,5/100,000 National: 102,4/100,000
b. Are patients with suspected or confirmed TB disease encountered in your setting (inpatient and outpatient)? 1) If yes, how many are treated in your health-care setting in 1 year? (Review laboratory data, infection-control records, and databases containing discharge diagnoses for this information.) 2) If no, does your health-care setting have a plan for the triage of patients with suspected or confirmed TB disease?	**No. patients** **Year Suspected Confirmed** 1 year ago _____ _____ 2 years ago _____ _____ 5 years ago _____ _____ Treatment algorithm
c. Currently, does your health-care setting have detected a cluster of persons with tuberculin skin test conversion or patients with active disease with confirmed TB disease during personnel screening or contact investigation or molecular epidemiology studies that might be a result of ongoing transmission of Mycobacterium tuberculosis?	
2. Risk Classification	
a. Inpatient settings	
1) How many inpatient beds are in your inpatient setting?	Quantity: 100
2) How many patients with TB disease are encountered in the inpatient setting in 1 year? (Review laboratory data, infection-control records, and databases containing discharge diagnoses.) 3) How many patients with SS+TB disease are encountered in the inpatient setting in 1 year? (Review laboratory data, infection-control	Previous year: 100 5 years ago: 100

records, and databases containing discharge diagnoses.)	256
4) Depending on the number of beds and TB patients encountered in 1 year, what is the risk classification for your inpatient setting?	___ Low risk ___ Medium risk _Y_ Potential ongoing transmission
5) Does your health-care setting have a plan for triaging patients with suspected or confirmed TB disease?	Algorithm
b. Outpatient settings	
1) How many TB patients are evaluated at your outpatient setting in 1 year? (Review laboratory data, infection-control records, and databases containing discharge diagnoses for this information.)	Previous year _____ 5 years ago _____
2) Is your health-care setting a TB clinic? (If yes, a classification of at least medium risk is recommended) classification?	
3) Does evidence exist that a high incidence of TB disease has been observed in the community that the health-care setting serves?	
4) Does evidence exist of person-to-person transmission in the health-care setting? (Use information from case reports. Determine if any TST or blood assay for *M.tuberculosis* (BAMT) conversions have occurred among health-care workers.)	
5) Does a high incidence of immunocompromised patients or HCWs in the health-care setting exist?	
6) Have patients with drug-resistant TB disease been encountered in your health-care setting within the previous 5 years?	Year encountered
7) When was the first time a risk classification was done for your health-care setting?	Date of classification
8) Considering the items above, would your health-care setting need a higher risk	
9) Depending on the number of TB patients evaluated in 1 year, what is the risk classification for your outpatient setting?	___ Low risk ___ Medium risk ___ Potential ongoing Transmission
10) Does your health-care setting have a plan for the triage of patients with suspected or confirmed TB disease?	
c. Nontraditional facility-based settings	
1) How many TB patients are encountered at your setting in 1 year?	Previous year_____

	5 years ago_____
2) Does evidence exist that a high incidence of TB disease has been observed in the community that the setting serves?	
3) Does evidence exist of person-to-person transmission in the setting?	
4) Have any recent TST or BAMT conversions occurred among staff or clients?	
5) Is there a high incidence or prevalence of immunocompromised patients or HCWs in the setting?	
6) Have patients with drug-resistant TB disease been encountered in your health-care setting within the previous 5 years?	Year encountered
3. Screening of HCWs for M. tuberculosis Infection	
a. Does the health-care setting have a TB screening program for HCWs?	Y (fluorography)
If yes, which HCWs are included in the TB screening program? (check all that apply) ___ Physicians ___ Mid-level practitioners (nurse practitioners [NP] and physician's assistants [PA]) ___ Nurses ___ Administrators ___ Laboratory workers ___ Respiratory therapists ___ Physical therapists ___ Contract staff ___ Construction or renovation workers ___ Service workers ___ Janitorial staff ___ Maintenance or engineering staff ___ Transportation staff ___ Dietary staff ___ Receptionists ___ Trainees and students ___ Volunteers ___ Others _____	All HCW's through fluorography
b. Is baseline skin testing performed with two-step TST for HCWs?	N
c. Is baseline testing performed with any other method than TST (ELISPOT or QuantiFERON®-TB or other) for HCWs?	
d. How frequently are HCWs tested for M. tuberculosis infection?	Frequency: *once a year*
e. Are M. tuberculosis infection test records maintained for HCWs?	
f. Where are test records for HCWs maintained?	Location: *archive*
g. Who maintains the records?	Name: Batyrbaeva - physician

h. If the setting has a serial TB screening program for HCWs to test for M. tuberculosis infection, what are the conversion rates for the previous years?†	1 year ago: 0 _____ 2 years ago: 0 _____ 3 years ago: 0 _____ 4 years ago: 0 _____ 5 years ago: 0 _____
i. Has the test conversion rate for M. tuberculosis infection been increasing or decreasing, or has it remained the same over the previous 5 years? (check one)	___ Increasing ___ Decreasing _X_ No change in prev. 5 years
j. Do any areas of the health-care setting (e.g., waiting rooms or clinics) or any group of HCWs (e.g., laboratory workers, emergency department staff, respiratory therapists, and HCWs who attend bronchoscopies) have a test conversion rate for M. tuberculosis infection that exceeds the health-care setting's annual average? If yes, list.	Rate: N
k. For HCWs who have positive test results for M. tuberculosis infection and who leave employment at the health setting, are efforts made to communicate test results and recommend follow-up of latent TB infection treatment with the local health department or their primary physician?	NA
4. TB Infection-Control Program	
a. Does the health-care setting have a written TB infection-control plan?	Y
b. Who is responsible for the infection-control program?	Name: chief nurse
c. When was the TB infection-control plan first written?	Date: 2007
d. When was the TB infection-control plan last reviewed or updated?	Date: 2008
e. Does the written infection-control plan need to be updated based on the timing of the previous update (i.e., >1 year, changing TB epidemiology of the community or setting, the occurrence of a TB outbreak, change in state or local TB policy, or other factors related to a change in risk for transmission of M. tuberculosis)?	
f. Does the health-care setting have an infection-control committee (or another committee with infection-control responsibilities)?	Chief nurse at facility level, senior nurse at department level.
1)If yes, which groups are represented on the infection-control committee? (check all that apply)	

___ Physicians _X_ Nurses ___ Epidemiologists ___ Engineers ___ Pharmacists ___ Laboratory personnel ___ Health and safety staff ___ Administrator ___ Risk assessment ___ Quality control ___ Others (specify)	
2) If no, what committee is responsible for infection control in the setting?	Committee
5. Implementation of TB Infection-Control Plan Based on Review by Infection-Control Committee	
a. Has a person been designated to be responsible for implementing an infection-control plan in your health-care setting? If yes, list the name.	Name: chief nurse
b. Based on a review of the medical records, what is the average number of days for the following: _1 hour_ Presentation of patient until collection of specimen. _1-3 hours_ Specimen collection until receipt by laboratory. _1-3_ Receipt of specimen by laboratory until smear results are provided to health-care provider. _3_ Diagnosis until initiation of standard antituberculosis treatment. _____ Receipt of specimen by laboratory until culture results are provided to health-care provider. _2-3 months_ Receipt of specimen by laboratory until drug-susceptibility results are provided to healthcare provider. _____ Receipt of drug-susceptibility results until adjustment of antituberculosis treatment, if indicated. _____ Admission of patient to hospital until placement in airborne infection isolation (AII).	Based on MOH orders
c. Through what means (e.g., review of TST or BAMT conversion rates, patient medical records, and time analysis) are lapses in infection control recognized?	Means: Observation, culture tests by SES, administrative control
d. What mechanisms are in place to correct lapses in infection control?	Mechanisms: administrative punishment
e. Based on measurement in routine QC exercises, is the infection-control plan being properly implemented?	N
f. Is ongoing training and education regarding TB infection-control	N

practices provided for HCWs?	
6. Laboratory Processing of TB-Related Specimens, Tests, and Results Based on Laboratory Review	
a. Where is the sputum collected in the facility _____ Sputum collection booth --Y-- Out-doors ----- Special room with appropriate ventilation ----- Other b. Which of the following tests are either conducted in-house at your health-care setting's laboratory or sent out to a reference laboratory? (check all that apply) **In-house Sent out** __Y_ _____ Acid-fast bacilli (AFB) smears _____ _____ Culture using liquid media (e.g., Bactec and MB-BacT) _____ _____ Culture using solid media _____ __Y__ Drug-susceptibility testing _____ _____ Nucleic acid amplification testing	
c. What is the usual transport time for specimens to reach the laboratory for the following tests? AFB smears ___1-2 hours___ Culture using liquid media (e.g., Bactec, MB-BacT) ___1-2 hours__ Culture using solid media _____ Drug-susceptibility testing _____ Nucleic acid amplification testing _____ Other (specify) _____	
c. Does the laboratory at your health-care setting or the reference laboratory used by your healthcare setting report AFB smear results for all patients within 24 hours of receipt of specimen? What is the procedure for weekends?	Y Does not work
7. Environmental Controls	
a. Which environmental controls are in place in your health-care setting? (check all that apply and describe)	

	Environmental control	Description	
	AII rooms		
	Local exhaust ventilation (enclosing devices and exterior devices)		
	General ventilation (e.g., single-pass system recirculation system)	*General ventilation system does not work. Opening windows is the single method.*	
	Air-cleaning methods (e.g., high efficiency particulate air [HEPA] filtration and ultraviolet germicidal irradiation [UVGI])		

b. What are the actual air changes per hour (ACH) and design for various rooms in the setting?

NA

Room	ACH		Design

c. Which of the following local exterior or enclosing devices such as exhaust ventilation devices are used in your health-care setting? (check all that apply)

NA

___ Laboratory hoods

___ Booths for sputum induction

___ Booths for sputum collection

___ Tents or hoods for enclosing patient or procedure

d. What general ventilation systems are used in your health-care setting? (check all that apply)

NA

___ Single-pass system

___ Variable air volume

___ Constant air volume

___ Recirculation system

___ Other _____

e. What air-cleaning methods are used in your health-care setting?

(check all that apply) HEPA filtration / UVGI ___ Fixed room-air recirculation systems / ___ Duct irradiation ___ Portable room-air recirculation systems / _Y_ Upper-air irradiation _Y_ Portable room-air cleaners	
f. How many AII rooms are in the health-care setting?	Quantity: 0
g. What ventilation methods are used for AII rooms? (check all that apply) Primary: (general ventilation) ___ Single-pass heating, ventilating, and air conditioning (HVAC) ___ Recirculating HVAC systems Secondary (methods to increase equivalent ACH): ___ Fixed room recirculating units ___ HEPA filtration ___ UVGI ___ Other (specify)	NA
h. Does your health-care setting employ, have access to, or collaborate with an environmental engineer (e.g., professional engineer) or other professional with appropriate expertise (e.g., certified industrial hygienist) for consultation on design specifications, installation, maintenance, and evaluation of environmental controls?	N
i. Are environmental controls regularly checked and maintained with results recorded in maintenance logs?	N
j. Is the directional airflow in AII rooms checked daily when in use with smoke tubes or visual checks?	N
k. Are these results readily available?	N
l. What procedures are in place if the AII room pressure is not negative? _____ _____	N
m. Do AII rooms meet the recommended pressure differential of 0.01-inch water column negative to surrounding structures?	N
8. Respiratory-Protection Program	
a. Does your health-care setting have a written respiratory-protection program?	MOH order # 130, 34

b. Which HCWs are included in the respiratory-protection program? (check all that apply)

	Physicians		Janitorial staff	
	Mid-level practitioners (NPs and PAs)		Maintenance or engineering staff	
	Nurses		Transportation staff	
	Administrators		Dietary staff	
Y	Laboratory personnel		Students	
	Contract staff		Others (specify)	
	Construction or renovation staff			
	Service personnel			

c. Are respirators used in this setting for HCWs working with TB patients? If yes, include manufacturer, model, and specific application (e.g., ABC model 1234 for bronchoscopy and DEF model 5678 for routine contact with infectious TB patients).

Manufacturer	Model	Specific application	
3M	9322 FFP2		

d. Is annual respiratory-protection training for HCWs performed by a person with advanced training in respiratory protection?	N
e. Does your health-care setting provide initial fit testing for HCWs? If yes, when is it conducted?	Date: N
f. Does your health-care setting provide periodic fit testing for HCWs? If yes, when and how frequently is it conducted?	NA
g. What method of fit testing is used?	Method: NA
h. Is qualitative fit testing used?	
i. Is quantitative fit testing used?	
9. Reassessment of TB Risk	
a. How frequently is the TB risk assessment conducted or updated in the health-care setting?	Frequency: NA
b. When was the last TB risk assessment conducted?	Date; NA

c. What problems were identified during the previous TB risk assessment? 1) _____ 2) _____ 3) _____ 4) _____ 5) _____	
d. What actions were taken to address the problems identified during the previous TB risk assessment? 1) _____ 2) _____ 3) _____ 4) _____ 5) _____	NA
e. Did the risk classification need to be revised as a result of the last TB risk assessment?	

D. Risk Assessment Worksheet TB unit under Tokmok City FMC

1. Incidence of TB	
a. What is the incidence of TB in your community (county or region served by the health-care setting), and how does it compare with the state and national average? * This information can be obtained from the state or local health department. The incidence of TB in your community could be calculated for SS – and SS+ patients separately	**Rate** Community (Rayon): 138.1/100,000 Oblast: 145/100,000 National: 105/100,000
b. Are patients with suspected or confirmed TB disease encountered in your setting (inpatient and outpatient)? 1) If yes, how many are treated in your health-care setting in 1 year? (Review laboratory data, infection-control records, and databases containing discharge diagnoses for this information.) 2) If no, does your health-care setting have a plan for the triage of patients with suspected or confirmed TB disease?	**No. patients** **Year Suspected Confirmed** 1 year ago 11362 1372 2 years ago 11292 2152 5 years ago 12808 666 Based on Algorithm
c. Currently, does your health-care setting have detected a cluster of persons with tuberculin skin test conversion or patients with active disease with confirmed TB disease during personnel screening or contact investigation or molecular epidemiology studies that might be a result of ongoing transmission of Mycobacterium tuberculosis?	N
2. Risk Classification	
a. Inpatient settings	
1) How many inpatient beds are in your inpatient setting?	Quantity
2) How many patients with TB disease are encountered in the inpatient setting in 1 year? (Review laboratory data, infection-control records, and databases containing discharge diagnoses.) 3) How many patients with SS+TB disease are encountered in the inpatient setting in 1 year? (Review laboratory data, infection-control records, and databases containing discharge diagnoses.)	Previous year: 5 years ago:

4) Depending on the number of beds and TB patients encountered in 1 year, what is the risk classification for your inpatient setting?	___ Low risk ___ Medium risk ___ Potential ongoing transmission
5) Does your health-care setting have a plan for triaging patients with suspected or confirmed TB disease?	
b. Outpatient settings	
1) How many TB patients are evaluated at your outpatient setting in 1 year? (Review laboratory data, infection-control records, and databases containing discharge diagnoses for this information.)	Previous year: 104 5 years ago: 100
2) Is your health-care setting a TB clinic? (If yes, a classification of at least medium risk is recommended) classification?	TB unit – Y, FMC – N
3) Does evidence exist that a high incidence of TB disease has been observed in the community that the health-care setting serves?	79 patients in 2007, 87 in 2008
4) Does evidence exist of person-to-person transmission in the health-care setting? (Use information from case reports. Determine if any TST or blood assay for *M.tuberculosis* (BAMT) conversions have occurred among health-care workers.)	N
5) Does a high incidence of immunocompromised patients or HCWs in the health-care setting exist?	No HCW, patients with HIV grow (2 in 2005, 1 in 2006, 1 in 2007, 4 in 2008)
6) Have patients with drug-resistant TB disease been encountered in your health-care setting within the previous 5 years?	Year encountered: in 2007, in 2008
7) When was the first time a risk classification was done for your health-care setting?	Date of classification: NA
8) Considering the items above, would your health-care setting need a higher risk	
9) Depending on the number of TB patients evaluated in 1 year, what is the risk classification for your outpatient setting?	___ Low risk _Y_ Medium risk _ _ Potential ongoing Transmission
10) Does your health-care setting have a plan for the triage of patients with suspected or confirmed TB disease?	Y, based on algorithm
c. Nontraditional facility-based settings	
1) How many TB patients are encountered at your setting in 1 year?	Previous year: NA 5 years

	ago_____
2) Does evidence exist that a high incidence of TB disease has been observed in the community that the setting serves?	
3) Does evidence exist of person-to-person transmission in the setting?	N
4) Have any recent TST or BAMT conversions occurred among staff or clients?	
5) Is there a high incidence or prevalence of immunocompromised patients or HCWs in the setting?	
6) Have patients with drug-resistant TB disease been encountered in your health-care setting within the previous 5 years?	Year encountered
3. Screening of HCWs for M. tuberculosis Infection	
a. Does the health-care setting have a TB screening program for HCWs?	Y (fluorography)
If yes, which HCWs are included in the TB screening program? (check all that apply) _Y_ Physicians _Y_ Mid-level practitioners (nurse practitioners [NP] and physician's assistants [PA]) _Y_ Nurses _N_ Administrators _Y_ Laboratory workers _Y_ Respiratory therapists _Y_ Physical therapists _NA_ Contract staff _NA_ Construction or renovation workers _Y_ Service workers _Y_ Janitorial staff _Y_ Maintenance or engineering staff _Y_ Transportation staff _NA_ Dietary staff _Y_ Receptionists _N_ Trainees and students _NA_ Volunteers ___ Others _____	
b. Is baseline skin testing performed with two-step TST for HCWs?	N (but on fluorography)
c. Is baseline testing performed with any other method than TST (ELISPOT or QuantiFERON®-TB or other) for HCWs?	N
d. How frequently are HCWs tested for M. tuberculosis infection?	Frequency: NA (fluorography once a year)

e. Are M. tuberculosis infection test records maintained for HCWs?	NA (Y for fluorography)
f. Where are test records for HCWs maintained?	Location: NA for tuberculin test, fluorography in database
g. Who maintains the records?	Name: chief nurse
h. If the setting has a serial TB screening program for HCWs to test for M. tuberculosis infection, what are the conversion rates for the previous years?† - *NA for tuberculin test, but through fluorography. All contacts are outside from health facility*	1 year ago: N 2 years ago: 2 3 years ago: 2 4 years ago: 3 5 years ago: 2
Has the test conversion rate for M. tuberculosis infection been increasing or decreasing, or has it remained the same over the previous 5 years? (check one) - *NA for tuberculin test, but through fluorography*	___ Increasing ___ Decreasing _Y_ No change in prev. 5 years
j. Do any areas of the health-care setting (e.g., waiting rooms or clinics) or any group of HCWs (e.g., laboratory workers, emergency department staff, respiratory therapists, and HCWs who attend bronchoscopies) have a test conversion rate for M. tuberculosis infection that exceeds the health-care setting's annual average? If yes, list.	N/A
k. For HCWs who have positive test results for M. tuberculosis infection and who leave employment at the health setting, are efforts made to communicate test results and recommend follow-up of latent TB infection treatment with the local health department or their primary physician?	N
4. TB Infection-Control Program	
a. Does the health-care setting have a written TB infection-control plan?	N
b. Who is responsible for the infection-control program?	Name: NA
c. When was the TB infection-control plan first written?	Date: NA
d. When was the TB infection-control plan last reviewed or updated?	Date: NA
e. Does the written infection-control plan need to be updated based on the timing of the previous update (i.e., >1 year, changing TB epidemiology of the community or setting, the occurrence of a TB outbreak, change in state or local TB policy, or other factors related to a change in risk for transmission of M. tuberculosis)?	Y

f. Does the health-care setting have an infection-control committee (or another committee with infection-control responsibilities)?	FMC chief nurse
1)If yes, which groups are represented on the infection-control committee? (check all that apply) _Y_ Physicians ___ Health and safety staff _Y_ Nurses ___ Administrator ___ Epidemiologists ___ Risk assessment ___ Engineers ___ Quality control ___ Pharmacists ___ Others (specify) ___ Laboratory personnel	
2) If no, what committee is responsible for infection control in the setting?	Committee: NA
5. Implementation of TB Infection-Control Plan Based on Review by Infection-Control Committee	
a. Has a person been designated to be responsible for implementing an infection-control plan in your health-care setting? If yes, list the name.	Name: NA
b. Based on a review of the medical records, what is the average number of days for the following: __30 min-7 days__ Presentation of patient until collection of specimen. __1 min-2 days__ Specimen collection until receipt by laboratory. __5 -2 days __ Receipt of specimen by laboratory until smear results are provided to health-care provider. __5 min-several days__ Diagnosis until initiation of standard antituberculosis treatment. _NA_ Receipt of specimen by laboratory until culture results are provided to health-care provider. _Once a quarter__ Receipt of specimen by laboratory until drug-susceptibility results are provided to healthcare provider. __NA__ Receipt of drug-susceptibility results until adjustment of antituberculosis treatment, if indicated. __NA__ Admission of patient to hospital until placement in airborne infection isolation (AII).	
c. Through what means (e.g., review of TST or BAMT conversion rates, patient medical records, and time analysis) are lapses in infection control recognized?	Means: NA

d. What mechanisms are in place to correct lapses in infection control?	Mechanisms: N
e. Based on measurement in routine QC exercises, is the infection-control plan being properly implemented?	Y, based on old regulations
f. Is ongoing training and education regarding TB infection-control practices provided for HCWs?	N
6. Laboratory Processing of TB-Related Specimens, Tests, and Results Based on Laboratory Review	
a. Where is the sputum collected in the facility _____ Sputum collection booth ---Y-- Out-doors ------ Special room with appropriate ventilation ----- Other b. Which of the following tests are either conducted in-house at your health-care setting's laboratory or sent out to a reference laboratory? (check all that apply) **In-house Sent out** __Y_ _____ Acid-fast bacilli (AFB) smears _____ _____ Culture using liquid media (e.g., Bactec and MB-BacT) _____ _____ Culture using solid media _____ _____ Drug-susceptibility testing _____ _____ Nucleic acid amplification testing	
c. What is the usual transport time for specimens to reach the laboratory for the following tests? AFB smears: *30 min – 7 days(average 2 days)* Culture using liquid media (e.g., Bactec, MB-BacT) _____ Culture using solid media _____ Drug-susceptibility testing _____ Nucleic acid amplification testing _____ Other (specify) _____	
c. Does the laboratory at your health-care setting or the reference laboratory used by your healthcare setting report AFB smear results for all patients within 24 hours of receipt of specimen? What is the procedure for weekends? –	Y *Does not work on weekends,*

	accepted on Mondays
7. Environmental Controls	
a. Which environmental controls are in place in your health-care setting? (check all that apply and describe)	

	Environmental control		Description
	AII rooms		
	Local exhaust ventilation (enclosing devices and exterior devices)	Y, in lab	
	General ventilation (e.g., single-pass system recirculation system)	Y, through opening windows	
	Air-cleaning methods (e.g., high efficiency particulate air [HEPA] filtration and ultraviolet germicidal irradiation [UVGI])	UVGI	

b. What are the actual air changes per hour (ACH) and design for various rooms in the setting?

NA, was not measured

Room	ACH		Design
N	N	N	

c. Which of the following local exterior or enclosing devices such as exhaust ventilation devices are used in your health-care setting? (check all that apply)

N

___ Laboratory hoods

___ Booths for sputum induction

___ Booths for sputum collection

___ Tents or hoods for enclosing patient or procedure

d. What general ventilation systems are used in your health-care setting? (check all that apply)

___ Single-pass system

___ Variable air volume

___ Constant air volume

___ Recirculation system

<table>
<tr><td>_Y_ Other: natural ventilation_____ _____</td><td></td></tr>
<tr><td>e. What air-cleaning methods are used in your health-care setting? (check all that apply)
<table><tr><td>HEPA filtration: N</td><td>UVGI: Y</td></tr><tr><td>___ Fixed room-air recirculation systems</td><td>___ Duct irradiation</td></tr><tr><td>___ Portable room-air recirculation systems</td><td>_Y_ Upper-air irradiation</td></tr><tr><td></td><td>_Y_ Portable room-air cleaners</td></tr></table></td><td></td></tr>
<tr><td>f. How many AII rooms are in the health-care setting?</td><td>Quantity: NA</td></tr>
<tr><td>g. What ventilation methods are used for AII rooms? (check all that apply)

Primary: (general ventilation)

___ Single-pass heating, ventilating, and air conditioning (HVAC)

___ Recirculating HVAC systems

Secondary (methods to increase equivalent ACH):

___ Fixed room recirculating units

___ HEPA filtration

_Y_ UVGI

___ Other

(specify)</td><td>NA</td></tr>
<tr><td>h. Does your health-care setting employ, have access to, or collaborate with an environmental engineer (e.g., professional engineer) or other professional with appropriate expertise (e.g., certified industrial hygienist) for consultation on design specifications, installation, maintenance, and evaluation of environmental controls?</td><td>N</td></tr>
<tr><td>i. Are environmental controls regularly checked and maintained with results recorded in

maintenance logs?</td><td>N</td></tr>
<tr><td>j. Is the directional airflow in AII rooms checked daily when in use with smoke tubes or visual checks?</td><td>N</td></tr>
<tr><td>k. Are these results readily available?</td><td>NA</td></tr>
<tr><td>l. What procedures are in place if the AII room pressure is not negative?</td><td>NA</td></tr>
</table>

_____ _____	
m. Do AII rooms meet the recommended pressure differential of 0.01-inch water column negative to surrounding structures?	NA
8. Respiratory-Protection Program	
a. Does your health-care setting have a written respiratory-protection program?	Based on MOH order # 130, 34
b. Which HCWs are included in the respiratory-protection program? (check all that apply)	

Y	Physicians	Y	Janitorial staff	
Y	Mid-level practitioners (NPs and PAs)	N	Maintenance or engineering staff	
Y	Nurses	N	Transportation staff	
N	Administrators	NA	Dietary staff	
Y	Laboratory personnel	Y	Students	
NA	Contract staff	Y	Others (specify)	
NA	Construction or renovation staff			
Y	Service personnel			

c. Are respirators used in this setting for HCWs working with TB patients? If yes, include manufacturer, model, and specific application (e.g., ABC model 1234 for bronchoscopy and DEF model 5678 for routine contact with infectious TB patients).

Manufacturer	Model	Specific application	

d. Is annual respiratory-protection training for HCWs performed by a person with advanced training in respiratory protection?	N
e. Does your health-care setting provide initial fit testing for HCWs? If yes, when is it conducted?	Date: N
f. Does your health-care setting provide periodic fit testing for HCWs? If yes, when and how	N

frequently is it conducted?	
g. What method of fit testing is used?	Method: NA
h. Is qualitative fit testing used?	
i. Is quantitative fit testing used?	
9. Reassessment of TB Risk	
a. How frequently is the TB risk assessment conducted or updated in the health-care setting?	Frequency: NA
b. When was the last TB risk assessment conducted?	Date: NA
c. What problems were identified during the previous TB risk assessment? 1) No separation of patients with MDR and primary TB visiting TB unit 2) Common path to physician's room and laboratory 3) There is no general or local ventilation systems 4) Old UVGI devices 5) There is no M3 and lack of FFP2 respirators _____	
d. What actions were taken to address the problems identified during the previous TB risk assessment? 1) _____ 2) _____ 3) _____ 4) _____ 5) _____	NA
e. Did the risk classification need to be revised as a result of the last TB risk assessment?	

E. Risk Assessment Worksheet TB Department of Tokmok Territorial City Hospital

1. Incidence of TB	
a. What is the incidence of TB in your community (county or region served by the health-care setting), and how does it compare with the state and national average? * This information can be obtained from the state or local health department. The incidence of TB in your community could be calculated for SS – and SS+ patients separately	**Rate** Community (Rayon): 169,5/100,000 Oblast: 158,5/100,000 National: 102,4/100,000
b. Are patients with suspected or confirmed TB disease encountered in your setting (inpatient and outpatient)? 1) If yes, how many are treated in your health-care setting in 1 year? (Review laboratory data, infection-control records, and databases containing discharge diagnoses for this information.) 2) If no, does your health-care setting have a plan for the triage of patients with suspected or confirmed TB disease?	**No. patients** **Year Suspected Confirmed** 1 year ago __9386__ __269__ 2 years ago __9476__ __286__ 5 years ago __8588__ __335__ Based on algorithm
c. Currently, does your health-care setting have detected a cluster of persons with tuberculin skin test conversion or patients with active disease with confirmed TB disease during personnel screening or contact investigation or molecular epidemiology studies that might be a result of ongoing transmission of Mycobacterium tuberculosis?	NA
2. Risk Classification	
a. Inpatient settings	
1) How many inpatient beds are in your inpatient setting?	Quantity: 272
2) How many patients with TB disease are encountered in the inpatient setting in 1 year? (Review laboratory data, infection-control records, and databases containing discharge diagnoses.) 3) How many patients with SS+TB disease are encountered in the inpatient setting in 1 year? (Review laboratory data, infection-control records, and databases containing discharge diagnoses.)	Previous year: 269 5 years ago: 335 47

4) Depending on the number of beds and TB patients encountered in 1 year, what is the risk classification for your inpatient setting?	___ Low risk ___ Medium risk _Y_ Potential ongoing transmission
5) Does your health-care setting have a plan for triaging patients with suspected or confirmed TB disease?	Algorithm
b. Outpatient settings	
1) How many TB patients are evaluated at your outpatient setting in 1 year? (Review laboratory data, infection-control records, and databases containing discharge diagnoses for this information.)	Previous year _____ 5 years ago _____
2) Is your health-care setting a TB clinic? (If yes, a classification of at least medium risk is recommended) classification?	
3) Does evidence exist that a high incidence of TB disease has been observed in the community that the health-care setting serves?	
4) Does evidence exist of person-to-person transmission in the health-care setting? (Use information from case reports. Determine if any TST or blood assay for *M.tuberculosis* (BAMT) conversions have occurred among health-care workers.)	
5) Does a high incidence of immunocompromised patients or HCWs in the health-care setting exist?	
6) Have patients with drug-resistant TB disease been encountered in your health-care setting within the previous 5 years?	Year encountered
7) When was the first time a risk classification was done for your health-care setting?	Date of classification
8) Considering the items above, would your health-care setting need a higher risk	
9) Depending on the number of TB patients evaluated in 1 year, what is the risk classification for your outpatient setting?	___ Low risk ___ Medium risk ___ Potential ongoing Transmission
10) Does your health-care setting have a plan for the triage of patients with suspected or confirmed TB disease?	
c. Nontraditional facility-based settings	
1) How many TB patients are encountered at your setting in 1 year?	Previous year _____ 5 years

	ago_____
2) Does evidence exist that a high incidence of TB disease has been observed in the community that the setting serves?	Y
3) Does evidence exist of person-to-person transmission in the setting?	N
4) Have any recent TST or BAMT conversions occurred among staff or clients?	N
5) Is there a high incidence or prevalence of immunocompromised patients or HCWs in the setting?	N
6) Have patients with drug-resistant TB disease been encountered in your health-care setting within the previous 5 years?	Year encountered: 2007, 2008
3. Screening of HCWs for M. tuberculosis Infection	
a. Does the health-care setting have a TB screening program for HCWs?	Y, *based in algorithm (fluorography)*
If yes, which HCWs are included in the TB screening program? (check all that apply) _Y_ Physicians _Y_ Mid-level practitioners (nurse practitioners [NP] and physician's assistants [PA]) _Y_ Nurses _Y_ Administrators _Y_ Laboratory workers _Y_ Respiratory therapists _Y_ Physical therapists _Y__ Contract staff _N__ Construction or renovation workers _Y_ Service workers _Y_ Janitorial staff _Y_ Maintenance or engineering staff _Y_ Transportation staff _Y_ Dietary staff _Y_ Receptionists _Y_ Trainees and students _NA_ Volunteers _NA_ Others _____	*All HCW's through fluorography*
b. Is baseline skin testing performed with two-step TST for HCWs?	N
c. Is baseline testing performed with any other method than TST (ELISPOT or QuantiFERON®-TB or other) for HCWs?	
d. How frequently are HCWs tested for M. tuberculosis infection?	Frequency: *NA for skin test, once a year for fluorography*
e. Are M. tuberculosis infection test records maintained for HCWs?	

f. Where are test records for HCWs maintained?	Location: *archive*
g. Who maintains the records?	Name: physician
h. If the setting has a serial TB screening program for HCWs to test for M. tuberculosis infection, what are the conversion rates for the previous years?†	1 year ago: _____ 2 years ago: _____ 3 years ago: _____ 4 years ago: _____ 5 years ago: _____
i. Has the test conversion rate for M. tuberculosis infection been increasing or decreasing, or has it remained the same over the previous 5 years? (check one)	___ Increasing ___ Decreasing _X_ No change in prev. 5 years
j. Do any areas of the health-care setting (e.g., waiting rooms or clinics) or any group of HCWs (e.g., laboratory workers, emergency department staff, respiratory therapists, and HCWs who attend bronchoscopies) have a test conversion rate for M. tuberculosis infection that exceeds the health-care setting's annual average? If yes, list.	Rate: N
k. For HCWs who have positive test results for M. tuberculosis infection and who leave employment at the health setting, are efforts made to communicate test results and recommend follow-up of latent TB infection treatment with the local health department or their primary physician?	NA
4. TB Infection-Control Program	
a. Does the health-care setting have a written TB infection-control plan?	Y
b. Who is responsible for the infection-control program?	Name: head of TB deprt. in TB dept., hospital epidemiologist in Tokmok Hospital
c. When was the TB infection-control plan first written?	Date: 2007
d. When was the TB infection-control plan last reviewed or updated?	Date: 2008
e. Does the written infection-control plan need to be updated based on the timing of the previous update (i.e., >1 year, changing TB epidemiology of the community or setting, the occurrence of a TB outbreak, change in state or local TB policy, or other factors related to	Y

a change in risk for transmission of M. tuberculosis)?	
f. Does the health-care setting have an infection-control committee (or another committee with infection-control responsibilities)?	Y
1)If yes, which groups are represented on the infection-control committee? (check all that apply) _Y_ Physicians ___ Health and safety staff _Y_ Nurses _Y_ Administrator _Y_ Epidemiologists ___ Risk assessment ___ Engineers _Y_ Quality control ___ Pharmacists ___ Others (specify) ___ Laboratory personnel	
2) If no, what committee is responsible for infection control in the setting?	Committee
5. Implementation of TB Infection-Control Plan Based on Review by Infection-Control Committee	
a. Has a person been designated to be responsible for implementing an infection-control plan in your health-care setting? If yes, list the name.	Name: head of TB deprt. in TB dept., hospital epidemiologist in Tokmok Hospital
b. Based on a review of the medical records, what is the average number of days for the following: _1 hour_ Presentation of patient until collection of specimen. _1-3 hours_ Specimen collection until receipt by laboratory. _1-3_ Receipt of specimen by laboratory until smear results are provided to health-care provider. _3_ Diagnosis until initiation of standard antituberculosis treatment. _____ Receipt of specimen by laboratory until culture results are provided to health-care provider. _2-3 months_ Receipt of specimen by laboratory until drug-susceptibility results are provided to healthcare provider. _____ Receipt of drug-susceptibility results until adjustment of antituberculosis treatment, if indicated. _____ Admission of patient to hospital until placement in airborne infection isolation (AII).	Based on MOH orders
c. Through what means (e.g., review of TST or BAMT conversion rates,	Means: Observation,

patient medical records, and time analysis) are lapses in infection control recognized?	culture tests by SES, administrative control
d. What mechanisms are in place to correct lapses in infection control?	Mechanisms: administrative punishment
e. Based on measurement in routine QC exercises, is the infection-control plan being properly implemented?	N
f. Is ongoing training and education regarding TB infection-control practices provided for HCWs?	N
6. Laboratory Processing of TB-Related Specimens, Tests, and Results Based on Laboratory Review	
a. Where is the sputum collected in the facility _____ Sputum collection booth --Y-- Out-doors ----- Special room with appropriate ventilation ----- Other b. Which of the following tests are either conducted in-house at your health-care setting's laboratory or sent out to a reference laboratory? (check all that apply) **In-house Sent out** _____ __Y__ Acid-fast bacilli (AFB) smears: *sent to FMC* _____ __Y__ Culture using liquid media (e.g., Bactec and MB-BacT): *sent to Chui Oblast TB Hospital* _____ __Y__ Culture using solid media: *sent to Chui Oblast TB Hospital* _____ __Y__ Drug-susceptibility testing: *sent to Chui Oblast TB Hospital* _____ __N__ Nucleic acid amplification testing	
c. What is the usual transport time for specimens to reach the laboratory for the following tests? AFB smears ___1 hour – 3 days___ Culture using liquid media (e.g., Bactec, MB-BacT) ___Once a week __ Culture using solid media ___ Once a week __ Drug-susceptibility testing ___ Once a week __ Nucleic acid amplification testing ___NA___ Other (specify) _____	

c. Does the laboratory at your health-care setting or the reference laboratory used by your healthcare setting report AFB smear results for all patients within 24 hours of receipt of specimen? What is the procedure for weekends?	Y Does not work
7. Environmental Controls	
a. Which environmental controls are in place in your health-care setting? (check all that apply and describe)	

	Environmental control	Description
	AII rooms	
	Local exhaust ventilation (enclosing devices and exterior devices)	Y, *in the lab*
	General ventilation (e.g., single-pass system recirculation system)	*General ventilation system does not work. Natural ventilation is the single method.*
	Air-cleaning methods (e.g., high efficiency particulate air [HEPA] filtration and ultraviolet germicidal irradiation [UVGI])	

b. What are the actual air changes per hour (ACH) and design for various rooms in the setting?

NA

Room	ACH	Design

c. Which of the following local exterior or enclosing devices such as exhaust ventilation devices are used in your health-care setting? (check all that apply)

NA

___ Laboratory hoods

___ Booths for sputum induction

___ Booths for sputum collection

___ Tents or hoods for enclosing patient or procedure

d. What general ventilation systems are used in your health-care setting? (check all that apply)

NA

<table>
<tr><td>___ Single-pass system

___ Variable air volume

___ Constant air volume

___ Recirculation system

___ Other _____ _____</td><td></td></tr>
<tr><td>e. What air-cleaning methods are used in your health-care setting? (check all that apply)
<table><tr><td>HEPA filtration</td><td>UVGI</td></tr><tr><td>___ Fixed room-air recirculation systems</td><td>___ Duct irradiation</td></tr><tr><td>___ Portable room-air recirculation systems</td><td>_Y_ Upper-air irradiation</td></tr><tr><td></td><td>_Y_ Portable room-air cleaners</td></tr></table></td><td></td></tr>
<tr><td>f. How many AII rooms are in the health-care setting?</td><td>Quantity: 0</td></tr>
<tr><td>g. What ventilation methods are used for AII rooms? (check all that apply)

Primary: (general ventilation)

___ Single-pass heating, ventilating, and air conditioning (HVAC)

___ Recirculating HVAC systems

Secondary (methods to increase equivalent ACH):

___ Fixed room recirculating units

___ HEPA filtration

___ UVGI

___ Other

(specify)</td><td>NA</td></tr>
<tr><td>h. Does your health-care setting employ, have access to, or collaborate with an environmental engineer (e.g., professional engineer) or other professional with appropriate expertise (e.g., certified industrial hygienist) for consultation on design specifications, installation, maintenance, and evaluation of environmental controls?</td><td>N</td></tr>
<tr><td>i. Are environmental controls regularly checked and maintained with results recorded in

maintenance logs?</td><td>N</td></tr>
<tr><td>j. Is the directional airflow in AII rooms checked daily when in use with</td><td>N</td></tr>
</table>

smoke tubes or visual checks?	
k. Are these results readily available?	N
l. What procedures are in place if the AII room pressure is not negative? _____ _____	N
m. Do AII rooms meet the recommended pressure differential of 0.01-inch water column negative to surrounding structures?	N
8. Respiratory-Protection Program	
a. Does your health-care setting have a written respiratory-protection program?	MOH order # 130, 34

b. Which HCWs are included in the respiratory-protection program? (check all that apply)

Y	Physicians	Y	Janitorial staff
Y	Mid-level practitioners (NPs and PAs)		Maintenance or engineering staff
Y	Nurses		Transportation staff
	Administrators		Dietary staff
Y	Laboratory personnel		Students
Y	Contract staff		Others (specify)
NA	Construction or renovation staff		
Y	Service personnel		

c. Are respirators used in this setting for HCWs working with TB patients? If yes, include

manufacturer, model, and specific application (e.g., ABC model 1234 for bronchoscopy and

DEF model 5678 for routine contact with infectious TB patients).

N, only masks

Manufacturer	Model	Specific application	

d. Is annual respiratory-protection training for HCWs performed by a person with advanced training in respiratory protection?				Y, by hospital epidemiologist
e. Does your health-care setting provide initial fit testing for HCWs? If yes, when is it conducted?				Date: N
f. Does your health-care setting provide periodic fit testing for HCWs? If yes, when and how frequently is it conducted?				N
g. What method of fit testing is used?				Method: NA
h. Is qualitative fit testing used?				
i. Is quantitative fit testing used?				
9. Reassessment of TB Risk				
a. How frequently is the TB risk assessment conducted or updated in the health-care setting?				Frequency: NA
b. When was the last TB risk assessment conducted?				Date; NA
c. What problems were identified during the previous TB risk assessment? 1) _____ 2) _____ 3) _____ 4) _____ 5) _____				
d. What actions were taken to address the problems identified during the previous TB risk assessment? 1) _____ 2) _____ 3) _____ 4) _____ 5) _____				NA

e. Did the risk classification need to be revised as a result of the last TB risk assessment?	

IX. Annex - Environmental controls record and evaluation[24]

Type of environmental control[25]	No.[26]	Location in the health-care setting[27]	How often maintained[28]	How often evaluated[5]	Last evaluation date	Next evaluation due date

[24] Some settings will not be able to complete all parts of the table. List environmental controls in order of effectiveness.
[25] For example, ultraviolet germicidal radiation (UVGI), high-efficiency particulate air (HEPA) filters, or airborne infection (ALL) room
[26] Number of UVGI units, HEPA filters, and ALL rooms in each location of the health-care setting
[27] For example, inpatient rooms, emergency departments, bronchoscopy suites, sputum induction rooms, outpatient areas, and waiting areas.
[28] Daily, weekly, monthly, annually, or other frequency (describe)

X. Annex - Patient Questionnaires

Questionnaire for the patient

Questions posed to patient regarding time elapsed from the onset of symptoms until start of anti-TB treatment

The questionnaire has two parts:

1. Reviewing the individual's TB history
2. Reviewing past and present contacts

INSTRUCTIONS:

- Circle each answer given by patient.
- Specify as needed
- Add your comments as the evaluator at the bottom of the page

Firstly registered TB – 14 patients

1	How long have you been in this department? (specify)	
2	Have you been sick with TB before?	
	YES	NO
3	If yes, when? (specify)	
4	Have you ever been treated with medication for TB?	
	YES	NO
5	Did you take all the TB medicine until the health care professional told you that you were finished?	
	YES	NO
Current TB episode		
	During this sickness period have you had any of these symptoms?	
6	Cough that has lasted longer than three weeks	
	YES	NO
7	Cough up blood or mucous	
	YES	NO

8	Decreased your appetite or aren't hungry							
	YES				NO			
9	Lost weight without trying to							
	YES				NO			
10	Night sweats (need to change the sheets or your clothes because they are wet)							
	YES				NO			
11	Other, specify							
12	When did you first notice any of the previously listed symptoms?							
	1 mth ago	3 mths ago	6 mths ago	9 mths ago	other			
13	How many weeks/months after you noticed the first symptoms did you go to see a doctor?							
	1 week	2 weeks	3 weeks	1 month	2 months	3 months	4 months	< 5 months
14	Which kind of doctor did you go to see? Specify							
15	Did the doctor ask you to bring sputum for analysis at the first appointment?							
	YES				NO			
16	Did the doctor sent you to for an x-ray at the first appointment?							
	YES				NO			
17	Did the doctor refer you to a nother doctor or facility? Specify							
18	When were you told that you have TB? (how long after the first interview with the doctor?) specify week/months after first visit to the doctor							
	1 day	2 days	3 days	4 days	5 days	6 days		
	1 week	2 w	3 w	4 w	5 w	other		
19	When did you start TB treatment? (how long after first interview with the doctor?) specify week/months after first visit to the doctor							
20	When did you come to the hospital? Specify							

Contacts		
21	How many people live in your household? Specify	
22	Were they checked for TB after you fell sick?	
	YES	NO
23	Were your friends and colleagues checked for TB after you fell sick?	
	YES	NO
24	Do you live with or have you been in close contact with someone who was recently diagnosed with TB? (close friend, relative, office-mate, other)	
	YES	NO
25	Have you lived with or have you been in close contact with (*In the past)* someone who was diagnosed with TB? (close friend, relative, office-mate, other)	
	YES	NO
26	When?	
27	Where you then screened for TB by a doctor?	
	YES	NO

Previously treated

1	How long have you been in this department? (specify)	
2	Have you been sick with TB before?	
	YES	NO
3	If yes, when? (specify)	
4	Have you ever been treated with medication for TB?	
	YES	NO
5	Did you take all the TB medicine until the health care professional told you that you were finished?	
	YES	NO

Current TB episode								
	During this sickness period have you had any of these syptoms?							
6	Cough that lasted longer than three weeks							
	YES				NO			
7	Cough up blood or mucous							
	YES				NO			
8	Decreased appetite / aren't hungry							
	YES				NO			
9	Lost weight without trying to							
	YES				NO			
10	Night sweats (need to change the sheets or your clothes because they are wet)							
	YES				NO			
11	Other, specify							
12	When did you first notice any of the previously listed symptoms?							
	1 mth ago	3 mths ago	6 mths ago	9 mths ago	other			
13	How many weeks/months after you first noticed the symptoms did you go to see a doctor?							
	1 week	2 weeks	3 weeks	1 month	2 months	3 months	4 months	< 5 months
14	Which kind of doctor did you go to see? specify							
15	Did the doctor askyou to bring the sputum for analysis at the first appointment?							
	YES				NO			
16	Did the doctor sent you to for an x-ray at the first appointment?							
	YES				NO			
17	Did the doctor refer you to an other doctor or facility? Specify							
18	When were you told that you have TB? (how long after first interview with the doctor?) specify week/months after first visit to the doctor							

	1 day	2 days	3 days	4 days	5 days	6 days
	1 week	2 w	3 w	4 w	5 w	other
19	When did you start TB treatment? (how long after first interview with the doctor?) specify week/months after first visit to the doctor					
20	When did you come to the hospital? Specify					
Contacts						
21	How many people live in your household? specify					
22	Were they checked for TB after you fell sick?					
	YES			NO		
23	Were your friends/colleaguess etc checked for TB after you fell sick?					
	YES			NO		
24	Do you live with or have you been in close contact with someone who was recently diagnosed with TB? (close friend, relative, office-mate, other).					
	YES			NO		
25	Have you lived with or have you been in close contact with (*In the past)* someone who was diagnosed with TB? (close friend, relative, office-mate, other).					
	YES			NO		
26	When?					
27	Were you then screened for TB by a doctor?					
	YES			NO		

XI. Annex - Summary of patient questionnaire data

		Kyrgyzstan		Kazakhstan	
		Patients with first detected case	**Relapses**	**Patients with first detected case**	**Relapses**
	Number of patients	**15**	**12**	**26**	**20**
1	How long have you been in this department?				
	less than 1 month	2		5	1
	1 months	10	4	6	8
	1-3 months	2	5	12	5
	3 - 6 months	3	3	3	6
	more than 6 months			0	
2	Have you been sick with TB before?				
	yes -		12		20
	no -	15		26	
3	If yes, when? (specify)				
4	Have you ever been treated with medication for TB?				
	yes -		12		20
	no -	15	0	26	
5	Did you take all the TB medicine until the health care professional told you that you were finished?				
	yes -	NA	7		19
	no -	NA	5	26	1
	Current TB episode				
	During this sickness period have you had any of these symptoms?				
6	Cough that has lasted longer than three weeks?				
	yes -	15	12	17	15

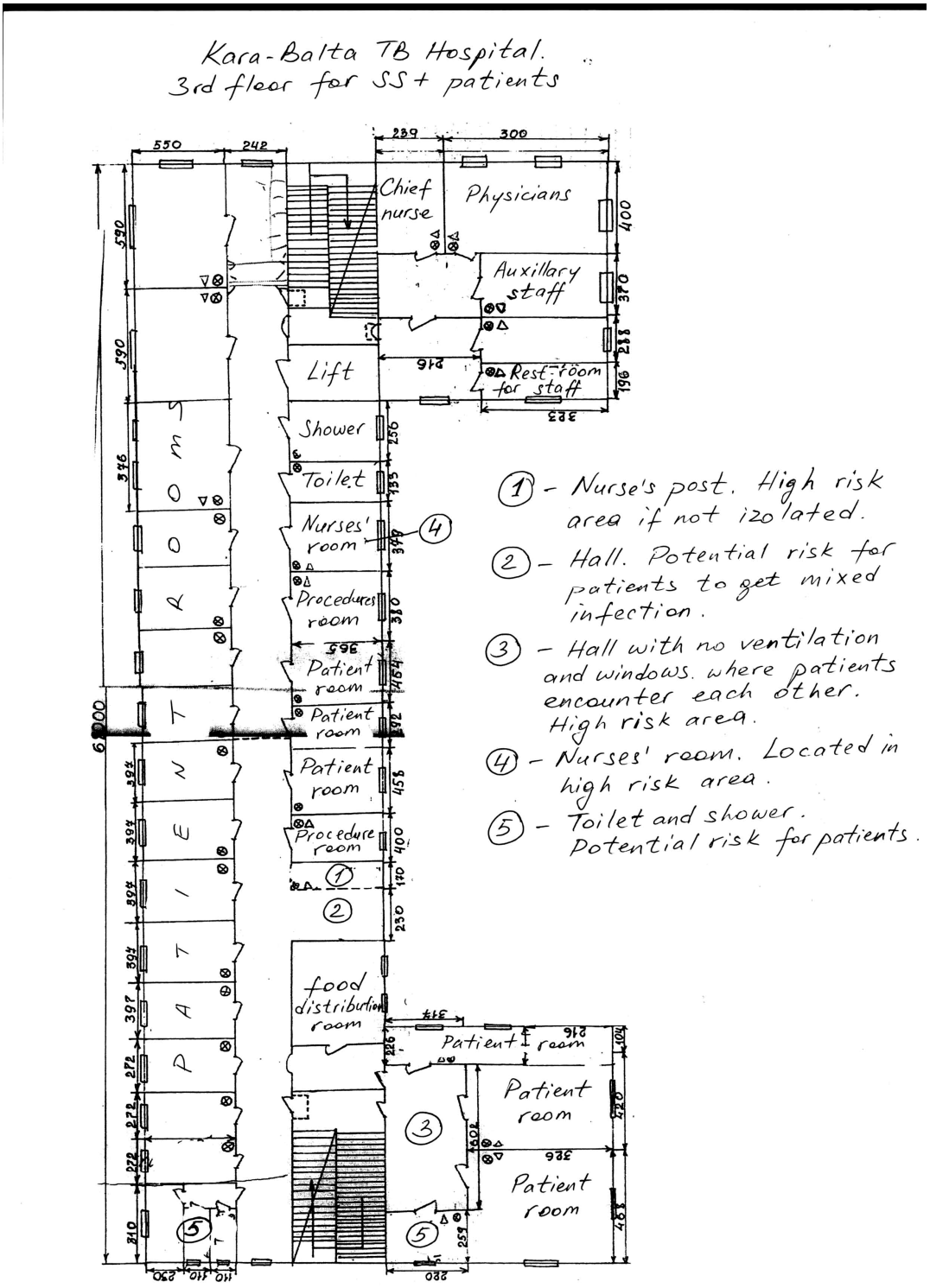
	no -	0	0	9	5
7	Cough up blood or mucous?				
	yes -	8	8	12	9
	no -	7	4	14	11
8	Decreased appetite / aren't hungry?				
	yes -	13	12	15	9
	no -	2	0	11	11
9	Lost weight without trying to?				
	yes -	13	12	19	11
	no -	2	0	7	9
10	Night sweats (need to change the sheets or your clothes because they are wet)?				
	yes -	8	9	14	9
	no -	7	3	10	11
11	Other, specify				
12	When did you first notice any of the previously listed symptoms?				
	1 month ago	5	4	7	3
	3 months ago	5	4	10	5
	6 months ago	3	4	1	3
	9 months ago	2		0	2
	Other			6	7
13	How many weeks/months after you noticed first symptoms did you go to see a doctor?				
	1 week	3	5	11	9
	2 weeks		1	4	3
	3 weeks		1	1	2
	1 month	4	2	6	3
	2 months	1	2	1	2
	3 months	2	1		1

	4 months	2		1	
	5 months	3			
14	Which kind of doctor did you go to see? specify				
	FGP	8	2	10	9
	TB specialist	4	9	5	10
	Other	3	1	9	1
15	Did the doctor ask you to bring sputum for analyses at the first appointment?				
	yes -	7	9	7	12
	no -	8	3	17	8
16	Did the doctor sent you for an x-ray at the first appointment?				
	yes -	13	10	20	19
	no -	2	2	4	1
17	Did the doctor refer you to another doctor or facility? Specify				
	yes - TB specialist	14	12	19	20
	no -	1	0	5	0
18	When were you told that you have TB? (How long after first interview with the doctor?) specify week/months after first visit to the doctor				
	1 day	2	6	7	9
	2 day			2	1
	3 day	5	6		7
	4 day	1		1	
	5 day	2			3
	6 day			1	
	1 week	4		3	
	2 week	1		1	
	3 week			1	

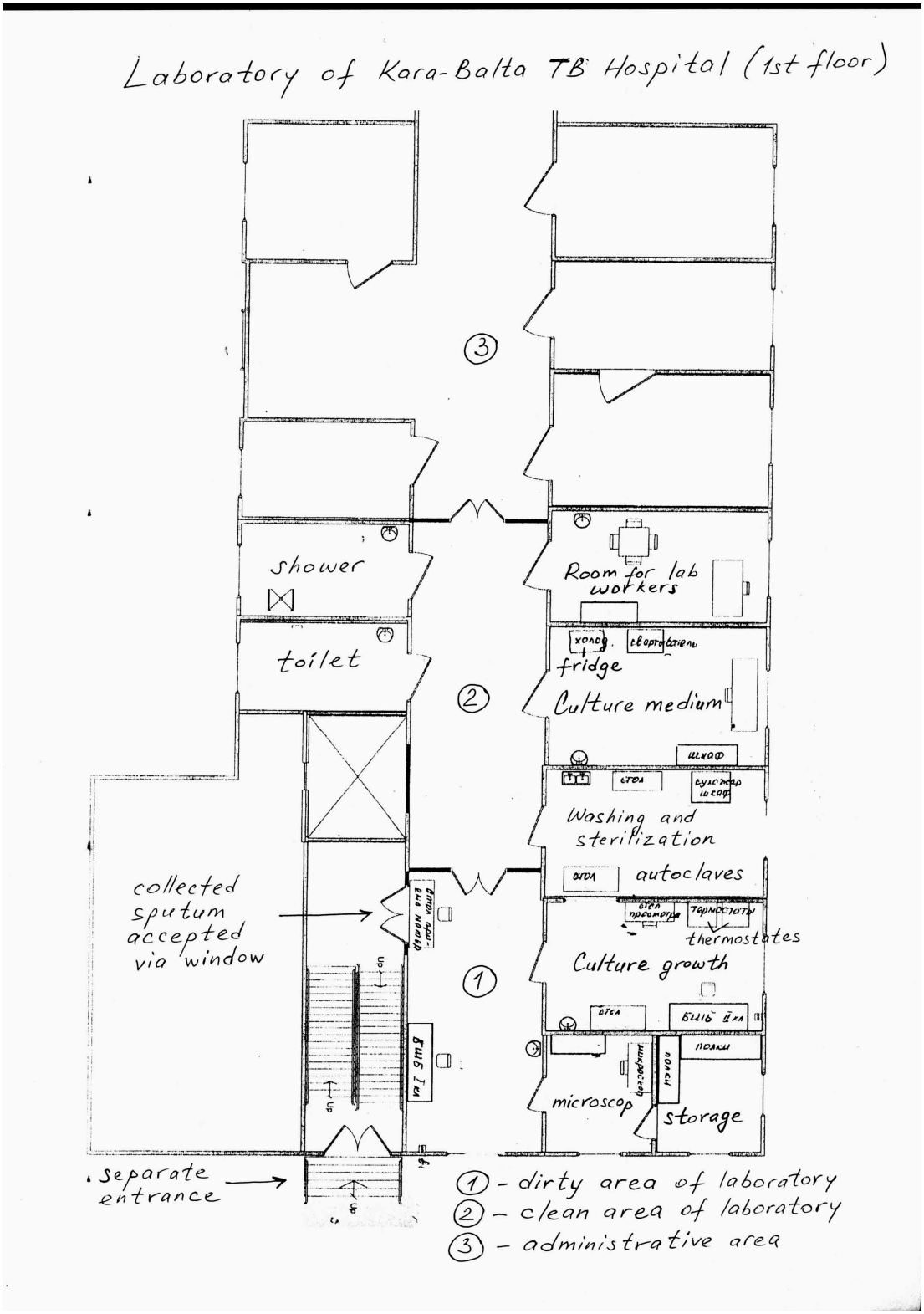
	4 week			6	
	5 week				
	other			1	
19	When did you start TB treatment? (How long after first interview with the doctor?) Specify week/months after first visit to the doctor				
	immediately	1	11	3	8
	1-2 weeks	11	1	11	7
	2-4 weeks	3		4	4
	2 months			4	1
	more than 2 months			2	
20	When you did you come to the hospital? Specify				
	Contacts				
21	How many people are living in your household? specify				
	1	2	2	1	2
	2	1		3	3
	3	6	4	3	2
	4	2	4	7	6
	5 or more	4	2	10	7
22	Were they checked for TB after you fell sick?				
	yes -	12	10	21	18
	no -	3	2	3	2
23	Were your friends/ workmates etc checked for TB after you fell sick?				
	yes -	2	6	5	2
	no -	13	6	19	18
24	Do you live with or have you been in close contact with someone who was recently diagnosed with TB? (close friend, relative,				

	office-mate, other).				
	yes -	3	2	4	2
	no -	12	10	20	18
25	Have you lived with or have you been in close contact with (*In the past)* someone who was diagnosed with TB? (close friend, relative, roommate at work, other).				
	yes -	7	5	5	6
	no -	8	7	19	14
26	When?				
27	Were you then screened for TB by a doctor?				
	yes -	2	2	2	2
	no -	13	3	18	4

XII. Annex - Layout of the TB Hospital Kara-Balta



XIII. Annex 23 Layout of the Laboratory in TB Hospital Kara-Balta



XIV. Annex 24 Key stakeholders in Kyrgyzstan

The following externally funded programs and projects are active in the country in the area of TB control.

• **German Government (through KFW financing).** The German Government TB program through KFW has been active since 1999, with the main areas being procurement of 1st line drugs, support to the NRL, and technical assistance. The current program phase (TB III and TB IV, until mid-2011) includes construction of the new NRL, renovation of the Bishkek TB Dispensary, procurement of laboratory equipment and other equipment for TB service institutions, and consulting services.

• **USAID (through Project HOPE, CDC, CAPACITY, and ZdravPlus).**

- *Project HOPE* provides capacity building and technical assistance in TB control. This includes promoting regional partnerships, improving management of the national program, improving patient compliance with treatment during the continuation phase, facilitating access to services for special populations, improving laboratory quality, and improving the policy environment through dissemination of results and lessons learned.
- *CDC* is active in the area of TB surveillance and information systems ended in 2009.
- The *CAPACITY* project focuses on building national capacities and developing regional cooperation in the area of TB/HIV control. Its funding ended in 2009.
- *ZdravPlus* provides support to the overall health system reform process and strengthens community involvement, which have an indirect but important impact on TB control.

• **The International Committee of the Red Cross (ICRC).** Since January 2004, the ICRC has supported TB control in the penitentiary sector through technical assistance, training, laboratory support, information and education activities, and limited investments in infrastructure at the prison TB hospital (Colony No. 27). In the beginning of 2007, the cooperation agreement was extended for additional two years.

• **Médecins Sans Frontières (MSF).** MSF TB project started in 2005 and is planned until 2010. The project focus is DOTS implementation in prisons (Colony No. 31 and pre-trial detention #1) by improving TB case management and supporting laboratory services.

• **Kyrgyzstan-Finland Lung Health Program (KFLHP).** The project started in 2003 and focuses on the implementation of PAL strategy for improved management of respiratory diseases through developing policy and guidance, training staff and upgrading health facilities in pilot areas. The second phase of the project is planned for the years 2007-2010.

•The **World Health Organization** provides technical assistance through its Regional Office in Copenhagen and the area office for Central Asia. This includes limited support for international training and consultancy, provided through these offices in addition to the funds provided within the Biennial Collaborative Agreements.

Millennium Development Goals and the Global Plan to Stop TB

In September 2000, Kyrgyzstan committed to the Millennium Declaration and Millennium Development Goals. The country objectives related to TB are: to decrease TB incidence to 1990 level (52 per 100,000 population), to decrease the mortality rate from TB to the 1990 level (7 per 100,000), to reach the global targets for case detection rate and treatment success rate under DOTS. These objectives are in line with the *Global Plan to Stop TB 2006-2015* and are further reiterated in the National TB Control Program, which outlines a framework for action to achieve these objectives.

Kyrgyzstan Comprehensive Development Framework

National TB control efforts build on and are fully integrated with the broad development strategies laid down in the *Comprehensive Development Framework (CDF) for Years 2001-2010,* adopted by the National Assembly on 29 May 2001 and the *National Poverty Reduction Strategy Paper (NPRSP)*, and adopted as a plan for the first stage of realization of the CDF in December 2002. CDF is a strategy for long-term development, aimed at orienting reforms towards people, raising living standards, and ensuring broad participation of citizens in the reform processes. The main development priorities of the Kyrgyz Republic stated in the CDF are:

• Forming an effective and transparent public administration, based on a democratic and open system of power, an independent, just and competent judiciary, professional, effective and accountable civil service and developed democratic institutions;

• Building a just society that provides protection and human development, protection of the rights and freedoms of citizens;

• Creating jobs and reducing poverty, developing a system of social security that is effective for every individual, gives access to good health care service and education to all and develops culture and science;

• Sustainable economic growth on the basis of a market economy, based on the principles of entrepreneurship, active development of viable branches of the productive sector and effective state regulation.

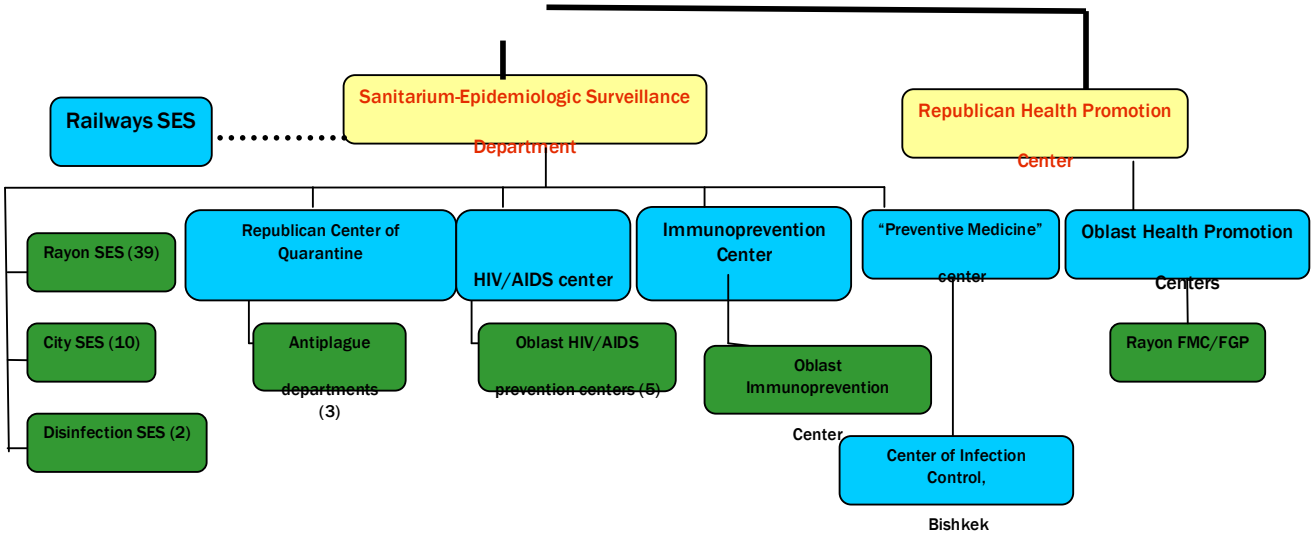
Health care has been included as a priority sector of the CDF, and particular emphasis has been given to improved population health and the provision of accessible and high quality health care. The main objective in the health sector in the CDF is to ensure fair and equal access to essential health services for all with emphasis on the poor and vulnerable populations, to be provided by the program of state guarantees. This objective has been the main focus of the *Manas* health reform program for 1996-2005 and its extension for 2006-2010. One of the areas of work for the implementation plan of CDF and NPRSP is control of infectious diseases including TB.

National health sector development plan

In continuation of the Manas health reform program 1996-2005, by Decree No. 100 from 16 February 2006 the Government of Kyrgyzstan adopted *Manas Taalimi National Health Care Reform Program 2006-2010*. Closely linked to the CDF and Medium Term Expenditure Framework (MTEF), Manas Taalimi represents a consensus-based reform program that promotes partnerships in the health sector towards improving health system performance and the population's health status in the country. The strategy places emphasis on priority development of Primary Health Care, implementation of new funding methods and strengthening public health interventions. TB control efforts have been integrated into Manas Taalimi over-arching strategies to improve health policy, financing, service delivery, public health, and community involvement. At the same time, a separate section of the strategy highlights TB control as a priority program and places special emphasis on reducing morbidity and mortality from TB and respiratory diseases through strengthening DOTS quality and expanding its framework and implementation of PAL. Activities planned under Manas Taalimi build on the NTP achievements to date, provide a policy framework to facilitate implementation of the third National TB Program, and contribute to improved coordination of TB control efforts within the health sector. A detailed five-year work plan was developed for each component of Manas Taalimi; costs of planned activities were estimated to better plan domestic

resources and mobilize additional external resources (e.g. through establishment of SWAP mechanism).

XV. Annex - SES and HIV/AIDS services structure



XVI. Annex - Persons met in Kyrgyzstan

1. Avtandil Alisherov, director of National TB Center
2. Hamid Bulatov, director of Chui Oblast TB Hospital
3. Zamira Karasartova, director of Kara-Balta TB Hospital
4. Galina Pereverzeva, Chief Nurse of Kara-Balta TB Hospital
5. Saera Uzuruphanova, Deputy Director of Jayil Rayon FMC in Kara-Balta
6. Svetlana Grigorieva, Jayil Rayon TB coordinator in Kara-Balta FMC
7. Maprat Ergasheva, Head of TB department from Tokmok Territorial City hospital
8. Jekshen Ismanov, head of TB unit from Tokmok City FMC
9. Leron Shaihievich Saidaliev, Head of Dispensary Department, Republican HIV/AIDS Center

XVII. Annex - Legal framework in Kyrgyzstan

1. The Law of KR # **65** on "Health Protection of Population of KR from TB". Approved in May 18, 1998.
2. National program "Tuberculosis-1" for 1996-2000 years. Approved by the government decree # **531** from December 15, 1995.
3. Plan of activities for implementation of assignments from the President of KR at Intersectoral Republican Meeting "Problems of TB in Kyrgyz Republic and the ways to resolve them" for 1998-2000.
4. National program "Tuberculosis-2" for 2001-2005 years. Approved by the government decree # **263** from June 6, 2001.
5. Amendments to the Law of KR # **65** on "Health Protection of Population of KR from TB" from January 20, 2005.
6. National program "Tuberculosis-3" for 2006-2010 years. Approved by the government decree # 331 from May 6, 2006.
7. The KR government decree # 542 and the MOH order from June 22 2004 "About the National TB Center".
8. The MOH order # 285 from August 30, 2000 "On further improvement of TB care for population of KR".
9. The order # **490** by the MOH from 06.11.03 "On organization of infrastructure of epidemiologic surveillance on hospital (nosocomial) infections".
10. The regulation on Republican Scientific-Practical Center of Infection Control (RCIC).
11. The regulation on Organization of IC in Health Facilities.
12. The regulations "On Specialist on IC in health facilities" with "Functional responsibilities of hospital epidemiologist and Nurse as IC specialists".
13. The temporary regulation "On activities of sanitarium-epidemiologic service structures on IC control under implementation of the system of IC in health facilities".
14. The order # 130 from 17.03. 2006 "On approval of standards on disinfection and sterilization in medical practices".
15. The standard "Disinfection and sterilization in medical practice: the main standards and rules". Approved by the MOH order # 130 from 17.03. 2006.
16. The standard "Disinfection and sterilization of pathogenic materials in laboratories". Approved by the MOH order # 130 от 17.03. 2006.
17. The standard "Cleaning of procedure and dressing rooms". Approved by the MOH order # 130 от 17.03. 2006.
18. The standard "Disinfection and sterilization in operational block". Approved by the MOH order # 130 от 17.03. 2006.
19. The standard "Disinfection and sterilization in delivery rooms". Approved by the MOH order # 130 от 17.03. 2006.
20. The standard "Cleaning of patient rooms". Approved by the MOH order # 130 от 17.03. 2006 г.
21. The standard "Organization of Centralized Sterilization Units (CSU) and sterilization rooms under clinical departments". Approved by the MOH order # 130 от 17.03. 2006.
22. The standard "Processing, disinfection and sterilization of endoscopes". Approved by the MOH order # **130** от 17.03. 2006.
23. The standard "Disinfection and sterilization in working with blood". Approved by the MOH order # **130** от 17.03. 2006.
24. The standard "Disinfection and sterilization in dental rooms". Approved by the MOH order # 130 от 17.03. 2006.
25. The order # **192** from 18.05.2005 "On prevention of nosocomial infections in surgery hospitals".

26. Instruction "On prevention of nosocomial infections in surgery hospitals". Approved by the order # 192.
27. The guideline "On organization of microbiological diagnostics and control". Approved by the order # 192.
28. The guideline "On epidemiologic surveillance on wound-borne surgical infections for prevention and treatment". Approved by the order # 192.
29. The order of rendering of reports on wound-borne nosocomial infections. Approved by the order # 192.
30. The evaluation tools of IC in healthcare organizations. Developed by the "Preventive medicine" center. Approved by the MOH order # .
31. The MOH order # **34** from 29.01.2008 "On improvement of system of IC and nosocomial infections preventive measures in healthcare organizations".
32. The standard on collection and transportation of biological material to bacteriologic laboratory.
33. The guideline "Epidemiologic surveillance of nosocomial infections". Developed by the "Preventive medicine" center. Approved by the MOH order # 34.

XVIII. Annex - HIV/AIDS data, Kyrgyzstan (from Republican HIV/AIDS Center)

Years	Number of detected cases	Kyrgyz residents (men/women)		Non-residents (men/women)	IDU's (incl. Kyrgyz residents)	Prison system
		HIV-positives	Including AIDS			
1987-2000	53	14 (11/3)	1 (0/1)	39 (36/3)	31 (8)	0
2001	149	134 (123/11)	1 (1/0)	15 (12/3)	142 (126)	70
2002	160	146 (134/12)	9 (8/1)	14 (13/1)	131 (121)	75
2003	132	125 (107/18)	10 (10/0)	7 (7/0)	113 (106)	39
2004	161	153 (119/34)	14 (12/2)	8 (6/2)	126 (119)	50
2005	171	165 (114/51)	20 (17/3)	6 (6/0)	108 (102)	39
2006	244	233 (170/63)	27 (22/5)	11 (9/2)	168 (161)	46
2007	409	388 (280/108)	26 (26/0)	21 (17/4)	251 (237)	87
2008	552	532 (353/179)	37 (27/10)	20 (17/3)	293 (277)	127
2009	186	185 (129/56)	16 (13/3)	1 (1/0)	113 (112)	39
Total	2217	2075 (1540/535)	161 (136/25)	142 (124/18)	1476 (1369)	572

XIX. Annex - TB notification and treatment outcome report, Kyrgyzstan

Treatment outcome, New pulmonary sputum smear positive, Kyrgyzstan, 2007

Oblast	Quarter	Notified cases	Cured		Treatment completed		Died			Failed		Defaulted		Transferred out			Individual therapy		Treatment success		Dgn not confirmed	
			№	%	№	%	of TB	Other reason	%	№	%	№	%	Inside country	Internat'l	%	№	%	№	%	№	%
Total Republic	1	462	366	79.2	19	4.1	10	6	3.5	19	4.1	32	6.9	6	0	1.3	4	0.9	385	83.3	0	0.0
	2	509	401	78.8	27	5.3	10	6	3.1	18	3.5	36	7.1	11	0	2.2	0	0.0	428	84.1	0	0.0
	3	403	327	81.1	10	2.5	9	5	3.5	18	4.5	20	5.0	10	1	2.7	1	0.2	337	83.6	2	0.5
	4	346	296	85.5	9	2.6	3	8	3.2	12	3.5	14	4.0	3	0	0.9	1	0.3	305	88.2	0	0.0
Total		1720	1390	80.8	65	3.8	32	25	3.3	67	3.9	102	5.9	30	1	1.8	6	0.3	1455	84.6	2	0.1

Treatment outcome, New pulmonary sputum smear negative, Kyrgyzstan, 2007

Oblast	Quarter	Notified cases	Cured		Treatment completed		Died			Failed		Defaulted		Transferred out			Individual therapy		Treatment success		Dgn not confirmed	
			№	%	№	%	of TB	Other reason	%	№	%	№	%	Inside country	International transfer	%	№	%	№	%	№	%
Всего по республике	1	507	0	0.0	442	87.2	4	10	2.8	3	0.6	29	5.7	6	2	1.6	0	0.0	442	89.1	11	2.2
	2	659	0	0.0	572	86.8	9	8	2.6	4	0.6	47	7.1	11	2	2.0	0	0.0	572	87.6	6	0.9
	3	523	0	0.0	473	90.4	2	8	1.9	1	0.2	26	5.0	6	3	1.7	0	0.0	473	91.1	4	0.8
	4	487	0	0.0	436	89.5	5	3	1.6	16	3.3	13	2.7	8	0	1.6	1	0.2	436	90.5	5	1.0
Total		2176	0	0.0	1923	88.4	20	29	2.3	24	1.1	115	5.3	31	7	1.7	1	0.0	1923	89.4	26	1.2

Treatment outcome, Relapses, Kyrgyzstan, 2007

Oblast	Quarter	Notified cases	Cured		Treatment completed		Died			Failed		Defaulted		Transferred out			Individual therapy		Treatment success		Dgn not confirmed	
			№	%	№	%	of TB	Other reason	%	№	%	№	%	Inside country	International transfer	%	№	%	№	%	№	%
Всего по республике	1	106	60	56.6	10	9.4	10	2	11.3	9	8.5	11	10.4	2	0	1.9	2	1.9	70	66.0	0	0.0
	2	116	54	46.6	15	12.9	11	3	12.1	12	10.3	16	13.8	1	0	0.9	3	2.6	69	60.0	1	0.9
	3	99	62	62.6	6	6.1	4	3	7.1	7	7.1	14	14.1	0	0	0.0	2	2.0	68	69.4	1	1.0
	4	110	69	62.7	11	10.0	7	0	6.4	10	9.1	7	6.4	2	0	1.8	3	2.7	80	72.7	0	0.0
Total		431	56.8	42	9.7	32	8	9.3	38	8.8	48	11.1	5	0	1.2	10	2.3	287	66.9	2	0.5	

Treatment outcome, Other re-treatment cases sputum smear positive, Kyrgyzstan, 2007

Oblast	Quarter	Notified cases	Cured		Treatment completed		Died			Failed		Defaulted		Transferred out			Individual therapy		Treatment success		Dgn not confirmed	
			№	%	№	%	of TB	Other reason	%	№	%	№	%	Inside country	International transfer	%	№	%	№	%	№	%
Всего по республике	1	78	32	41.0	3	3.8	7	3	12.8	12	15.4	17	21.8	3	0	3.8	0	0.0	35	45.5	1	1.3
	2	40	22	55.0	1	2.5	0	2	5.0	9	22.5	5	12.5	1	0	2.5	0	0.0	23	57.5	0	0.0
	3	59	25	42.4	1	1.7	5	4	15.3	8	13.6	9	15.3	3	0	5.1	4	6.8	26	44.1	0	0.0
	4	38	23	60.5	3	7.9	2	1	7.9	5	13.2	3	7.9	0	0	0.0	1	2.6	26	68.4	0	0.0
Total		215	102	47.4	8	3.7	14	10	11.2	34	15.8	34	15.8	7	0	3.3	5	2.3	110	51.4	1	0.5

Treatment outcome, Other re-treatment cases sputum smear negative, Kyrgyzstan, 2007

Oblast	Quarter	Notified cases	Cured		Treatment completed		Died			Failed		Defaulted		Transferred out			Individual therapy		Treatment success		Dgn not confirmed	
			№	%	№	%	of TB	Other reason	%	№	%	№	%	Inside country	International transfer	%	№	%	№	%	№	%
Всего по республике	1	105	0	0.0	77	73.3	2	6	7.6	6	5.7	10	9.5	2	0	1.9	0	0.0	77	74.8	2	1.9
	2	110	0	0.0	82	74.5	0	3	2.7	1	0.9	18	16.4	1	2	2.7	0	0.0	82	76.6	3	2.7
	3	89	0	0.0	66	74.2	2	2	4.5	1	1.1	13	14.6	3	0	3.4	1	1.1	66	75.0	1	1.1
	4	95	0	0.0	72	75.8	1	3	4.2	2	2.1	11	11.6	3	0	3.2	0	0.0	72	76.6	1	1.1
Total		399	0	0.0	297	74.4	5	14	4.8	10	2.5	52	13.0	9	2	2.8	1	0.3	297	75.8	7	1.8

Treatment outcome, Extra-pulmonary TB, Kyrgyzstan, 2007

Oblast	Quarter	Notified cases	Cured		Treatment completed		Died			Failed		Defaulted		Transferred out			Individual therapy		Treatment success		Dgn not confirmed	
			№	%	№	%	of TB	Other reason	%	№	%	№	%	Inside country	International transfer	%	№	%	№	%	№	%
Всего по республике	1	415	0	0.0	383	92.3	0	3	0.7	2	0.5	9	2.2	9	0	2.2	0	0.0	383	94.3	9	2.2
	2	540	0	0.0	492	91.1	1	1	0.4	4	0.7	23	4.3	7	1	1.5	0	0.0	492	93.0	11	2.0
	3	383	0	0.0	355	92.7	1	5	1.6	0	0.0	12	3.1	3	1	1.0	0	0.0	355	94.2	6	1.6
	4	389	0	0.0	362	93.1	3	5	2.1	1	0.3	8	2.1	6	0	1.5	0	0.0	362	93.8	3	0.8
Total		1727	0	0.0	1592	92.2	5	14	1.1	7	0.4	52	3.0	25	2	1.6	0	0.0	1592	93.8	29	1.7

XX. Annex - Treatment outcome report, Tokmok and Kara-Balta, 2007

Notification and treatment outcome, Tokmok, 2007

	M	F	Total	Cured	Tx completed	Died	Failed	Defaulted	Tr out	Treatment success No	Treatment success %
New pulmonary SS+	21	12	33	30			2		1	30	90.9
New pulmonary SS-	25	16	41		39				2	39	95.1
Extrapulmonary new	4	8	12		11				1	11	91.7
Relapses SS+	2	1	3	3						3	100.0
Other re-treatment cases SS+	7	3	10	8			2			8	80.0
Other re-treatment cases SS-	4	1	5		5					5	100.0
TOTAL			**104**								

Notified TB patients in Tokmok, 2008

New pulmonary SS+	26
New pulmonary SS-	46
New extrapulmonary	15
Relapses pulmonary SS+	1
Other	4
Other re-treatmnet cases SS+	9
TOTAL	**101**

Notification and treatment outcome, Kara-Balta, 2007

	M	F	Total	Cured	Tx compl	Died	Failed	Default	Tr out	Treatment success No	Treatment success %
New pulmonary SS+	43	17	60	40	6	1	7	5	1	46	76.7
New pulmonary SS-	32	29	61		55	1	1	4		55	90.2
Extrapulmonary new	21	18	39		38	1				38	97.4
Relapses SS+	14	5	19	6	3	3	5	2		9	47.4
Other re-treatment cases SS+			18	4	1	3	7	3		5	27.8
Other re-treatment cases SS-			20		16	1	1	2		16	80.0
TOTAL			**217**								

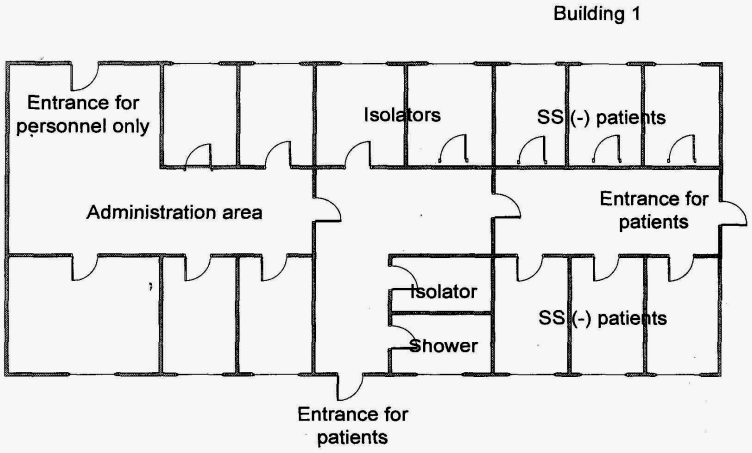
Notified TB patients in Kara-Balta,

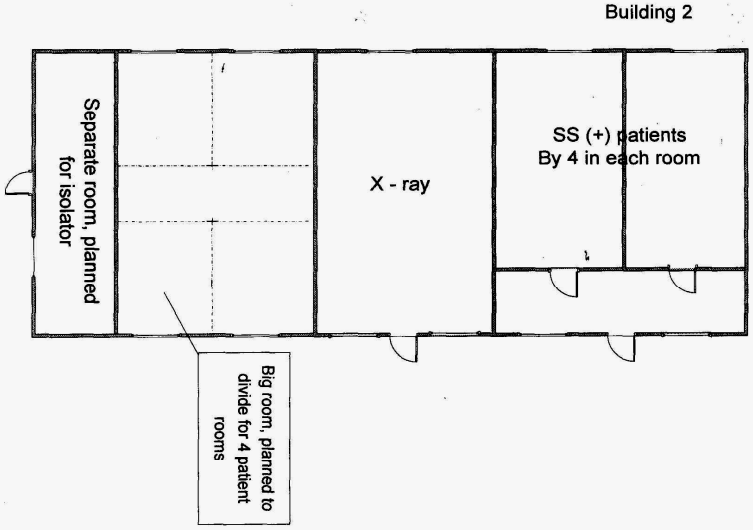
TB Unit in the FMC, 2008

New pulmonary SS+	64	
New pulmonary SS-	55	
Relapses pulmonary SS+	21	
other re-treatmnet cases SS-	16	
Other re-treatmnet cases SS+	9	
Extrapulmonary	41	
TOTAL	**206**	
SS+ out of total	94	46
	NO	%

XXI. Annex - Layout of the TB department in Tokmok

Annex 20 Layout of the TB department in Tokmok
Territorial City Hospital





XXII. Annex - Layout of the TB Unit FMC in Kara-Balta

Annex 21

TB Unit at Kara-Balta
FMC